THE IRON AGE

April 16, 1931

Trend of Real Wages	1247
Slow Draw Press Motion	1251
Open-Hearth Ports	1254
Reducing Motions in the Foundry	1258
Data for Sheet Buyers	1264
Metal Terrestrial Globes	1270
Galvanizing Pot Life	1274
All-Welded Hopper Car	1279
Alloys in Capt. Campbell's "Blue Bird"	1280
Dr. Haney's Page	1303

▼ ▼ ▼

New Equipment	1283
News	1291
Personals and Obituaries	1300
Editorials	1304
Markets	1307
Construction and Equipment Buying	1328

▼ ▼ ▼

OUR READERS SPEAK

WE have before us a pile of letters, several inches high, complimenting us on the improvements made in The Iron Age beginning with the first issue of April. A few specimens of the comments are:

"Much pleased with the new dress. The cover is very attractive—modern, striking—yet restrained and dignified." . . . "You have made a great improvement in arrangement of your news items. We like very much the attractive head lines to your articles." . . . "The Iron Age improves with age and is getting better and better." . . .

"Were it not for the enterprise of your staff in always developing some improvement, one would be led to feel you have now about reached perfection in trade journalism." . . . "I do not like to use superlatives, but I believe, with your book before me, I could eliminate all the rest." . . .

"Present arrangement cannot be improved upon." . . . "The Iron Age is a part of our lives." . . . "We find The Iron Age the most attractive paper." . . . "After examining current issue, we find a good magazine even better, if that could be possible." . . . "Best of its kind." . . . "Grows more popular and efficient as the years progress." . . . "It would be hard to improve on your April 2 issue." . . . "Much improved. It is about the only magazine or trade paper we really take time to read."

—A. H. D.

76th IRON AGE YEAR

W. W. MACON, *Editor*
A. I. FINDLEY, *Editor Emeritus*
G. L. LACHER, *Managing Editor*
C. E. WRIGHT, *News Editor*

E. F. CONE
S. G. KOON
R. E. MILLER
G. S. HERRICK

F. L. PRENTISS
Cleveland
R. A. FISKE
Chicago
T. H. GERKEN
Pittsburgh
BURNHAM FINNEY
Detroit
L. W. MOFFETT
Washington
GERARD FRAZAR
Boston
R. G. McINTOSH
Cincinnati

IRON AGE PUBLISHING CO.
239 West 39th Street,
New York, N. Y.

Cable Address: "Ironage, N. Y."

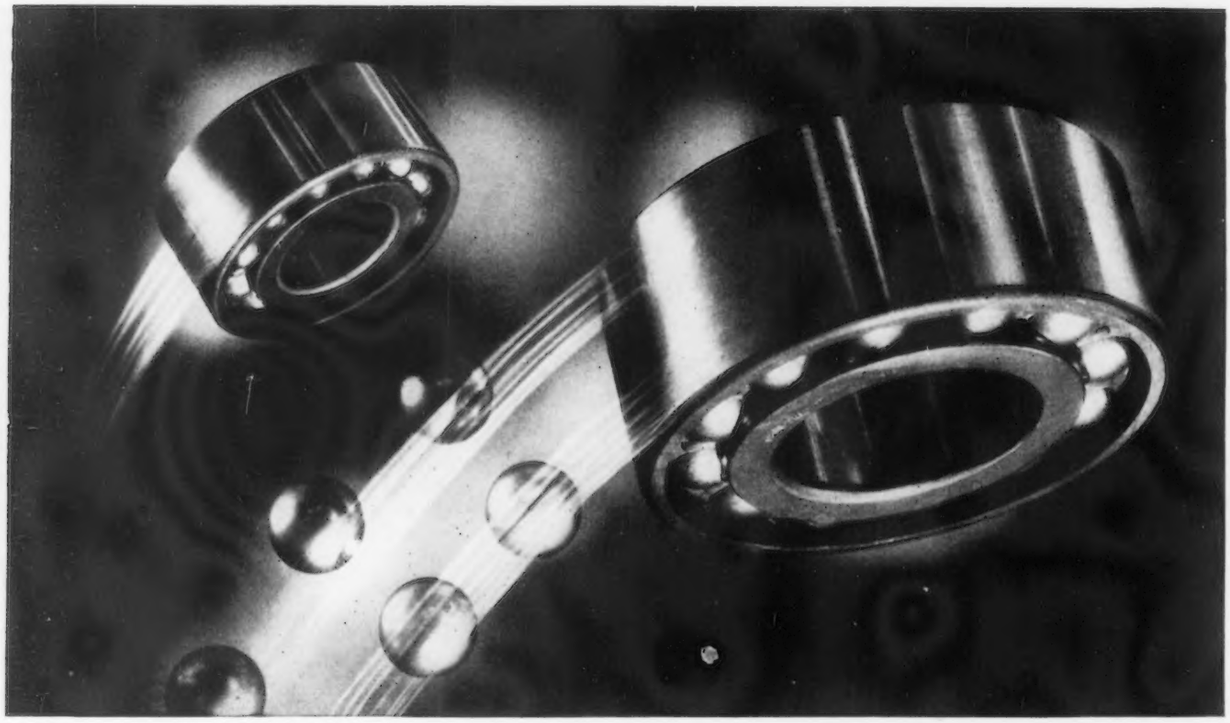
F. J. FRANK, *President*
G. H. GRIFFITHS, *Secretary*
C. S. BAUR, *General Advertising Manager*

Division of
UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

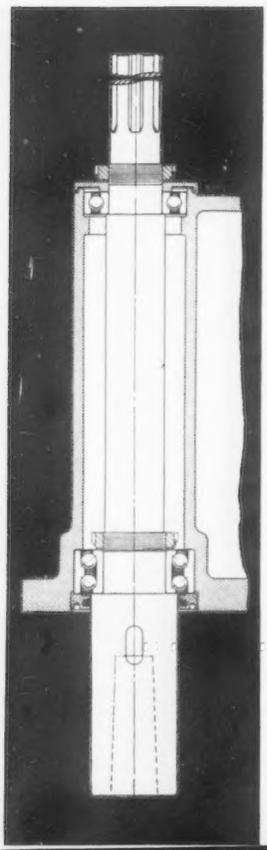
District Offices:
CHICAGO, Otis Building
PITTSBURGH, 1319 Park Building
CLEVELAND, 1362 Hanna Building
PHILADELPHIA, 1402 Widener Bldg.
DETROIT, 7338 Woodward Avenue
WASHINGTON, 536 Investment Bldg.
CINCINNATI, 402 Traction Building
BUFFALO, 616 Ellicott Square
BOSTON, Room 230, 80 Federal St.
SAN FRANCISCO, 381 Bush Street and 1045 Sansome St.

Copyright, 1931, by
IRON AGE PUBLISHING CO.

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; foreign, $12.00 a year. Single Copy 25 Cents.

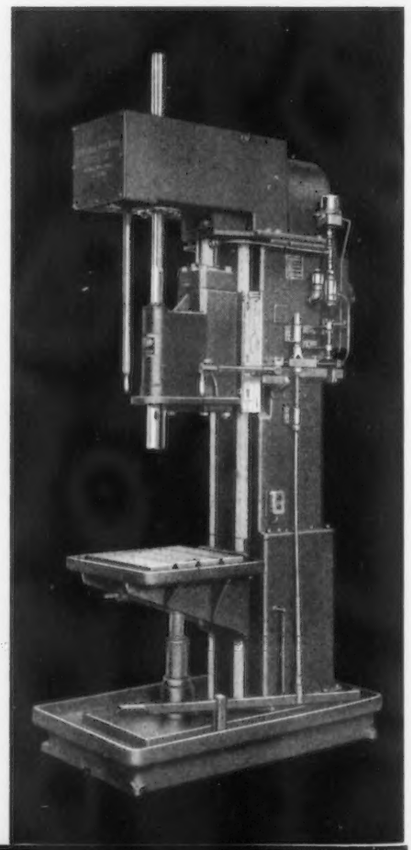


. . . for simple and sensible mountings



No simpler nor more effective drill spindle mountings have ever been evolved than those employing the New Departure Double Row ball bearing. Such a design is used in Master drilling machines built by the Superior Machine Tool Company, of Kokomo, Indiana. The Double Row New Departure is compact and accurate, has high thrust capacity. It is preloaded at assembly for permanent rigidity, needs no further adjustments — ever. This bearing eliminates lag and looseness in the spindle . . . drills start cutting as soon as pressure is applied. We will gladly tell you more about this long-lived bearing. It may save money for you. The New Departure Mfg. Company, Bristol, Connecticut; Detroit, Chicago, San Francisco.

NOTHING ROLLS LIKE A BALL



NEW DEPARTURE BALL BEARINGS

THIS ISSUE IN BRIEF

APRIL 16, 1931

Long-Time Wage Trend is Steadily Upward

Study of 70-year period from 1859 to 1929 reveals that declines have been temporary and but mere incidents in the progress of events.—Page 1250.

* * *

"Slow-Draw" Crank Press Increases Output

Redrawing of long shells and broaching and burnishing of bushings can be safely speeded up 70 per cent, press builder predicts. Velocity of punch is low when resistance to drawing is greatest—at initial contact.—Page 1253.

* * *

Open-Hearth Fuel Economy Gained by Greater Gas Velocity

The reaction of combustion is increased, and a better convective heat transfer from the flame to the metal bath is gained. This calls for special ports and increased chimney draft. —Page 1257.

* * *

Ten Men in Foundry Do Work of 30

Sand and mold-handling equipment saves two-thirds of labor in carbureter plant foundry. — Page 1258.

* * *

Sheet Maker Will Help Reduce Your Stamping Costs

Steel makers have a store of accumulated experience which will help solve your problems, and offer advice as to improving your product and lowering your cost.—Page 1267.

* * *

Metal-Ware Galvanizing Pot Should Last 18 to 24 Months

Investigation reveals that extreme range of service is four months to 60 months. Of all fuels, coke gives the longest pot life.—Page 1277.

* * *

Specify How You Want Your Sheets Shipped

Where crane facilities for unloading are available, box car loading is being superseded by open or gondola car loading. If you specify the methods of loading, you assume responsibility of safe arrival.—Page 1268.

Price Declines Have Not Affected Wages

Even in periods of prolonged commodity price declines wages have steadily increased. Average annual wage more than doubled in the five-year period from 1914 to 1919.—Page 1250.

* * *

Preventing Pressed Metal Failures

Higher drawing speed does not set up increased resistance to drawing, after the starting resistance has been overcome. The start is the crucial moment. Suddenness in starting the metal moving is what breaks the sheet.—Page 1253.

* * *

Ideal Open-Hearth Port

Flame should have intimate contact with the bath. The port should provide as large a contact surface as possible, in the place where the flame has the highest temperature.—Page 1254.

* * *

Tall Stacks Best for Open-Hearth Furnaces

Increase in gas velocity increases the velocity of escaping gases of combustion in the gas port, which requires a high chimney or the use of forced draft. Otherwise the gas chamber will remain cold.—Page 1257.

* * *

Iron Melted in Electric Arc Furnace

Carbureter castings in new foundry are made from iron melted in an electric arc furnace. The charge consists of pig iron, foundry scrap, cast scrap, and low phosphorus scrap steel. —Page 1258.

* * *

Eliminates "Orange Peel" Effect in Deep Drawing

Normalizing produces such a fine grain structure in cold-rolled sheets that forming with or across the grain makes little apparent difference.—Page 1267.

* * *

Welded Freight Car Stands the "Gaff"

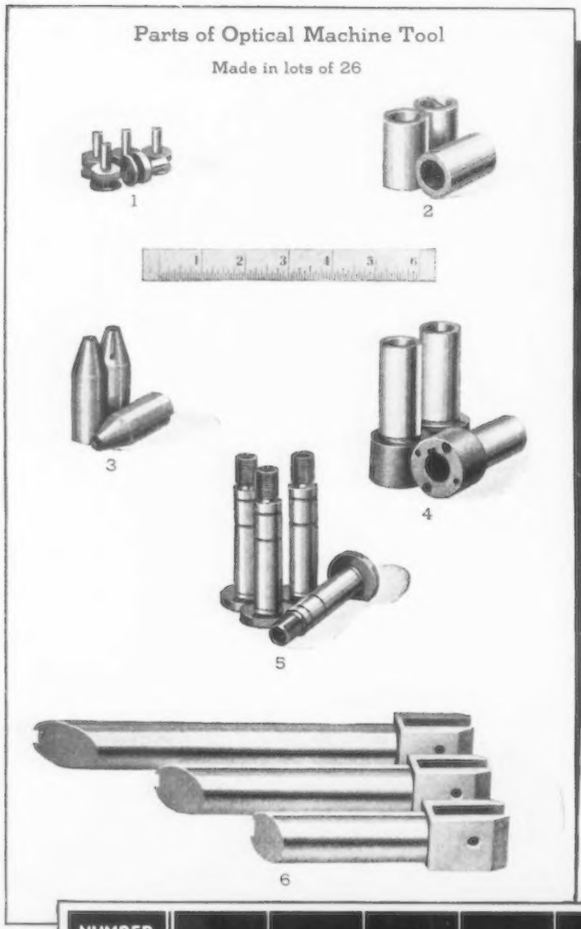
A 95-ton all-welded hopper car, in use since October, 1929, is giving good service. Ratio of pay load to tare is 3.34 to 1. On the standard car the ratio is 2.78 to 1.—Page 1280.

NEXT WEEK

WHAT happens to industry during long term periods of declining prices? A live subject, this, for economists believe that we may experience a similar trend to that which followed our Civil War.

The leading article in next week's Iron Age will tell, in detail, what happened to costs, prices and profits during this long term price trend. This much we will tell you in advance—declining prices do not need to mean declining profits. The stimulus of competition and the urge of necessity often impel more rapid progress than the easier going of the long term upward swings.

Tool Room Work on a Production Basis



at
Bausch & Lomb Optical Company
Rochester, N. Y.

These parts were formerly made on two machines—an old type turret lathe and an engine lathe.

Now, one Warner & Swasey No. 4 Universal, 12 speed all geared head turret lathe does both chuckings in half the time. Look at the savings made on these jobs.

You, too, can duplicate such savings!

A W & S production research engineer will gladly make a careful study of your problem and submit recommendations for lowering your costs. His services are yours without cost or obligation. Write or wire for him today.

NUMBER OF PART	1	2	3	4	5	6
NAME	SHIFTER ROD PIN	SHAFT BUSHING	BEARING CENTER	SHAFT BUSHING	"T" BOLTS	TOOL BARS
MATERIAL	C.R.STEEL	CAST IRON	TOOL STEEL	CAST IRON	C.R.STEEL	C.R.STEEL
OLD TIME	9.8 minutes	14.5 minutes	14.6 minutes	27.6 minutes	27.5 minutes	30.6 minutes
NEW TIME	8 minutes	11.2 minutes	10.3 minutes	11.5 minutes	18.3 minutes	11 minutes
TIME SAVED	1.8 minutes	3.3 minutes	4.3 minutes	16.1 minutes	9.2 minutes	19.6 minutes

Another example of
PROFITABLE REPLACEMENT

The Warner & Swasey Co.

Cleveland, Ohio, U. S. A.

..THE IRON AGE..

NEW YORK, APRIL 16, 1931

ESTABLISHED 1855 VOL. 127, No. 16

OUR MANUFACTURING WORKER AND HIS WAGE

By SIDNEY G. KOON

Associate editor, THE IRON AGE, New York

▲ ▲ ▲

IN view of the present-day discussions of wage rates, it is well to consider the facts. The accompanying article presents some indisputable ones, drawn from a 70-year record of American production and wages.

Since 1869, with but a few exceptions which help to prove the rule, the "real" wages of American manufacturing industry have steadily increased. And yet, in 1929, the latest year for which information is available — a year of exceptional profits and large dividend payments—the percentage of wages to production values was less than for any year since 1909.

Wages—and prosperity—have steadily increased even during long-term periods of declining prices. It is well to consider this fact before we heed the counsel of those who would attempt to reverse a 70-year trend.

▼ ▼ ▼

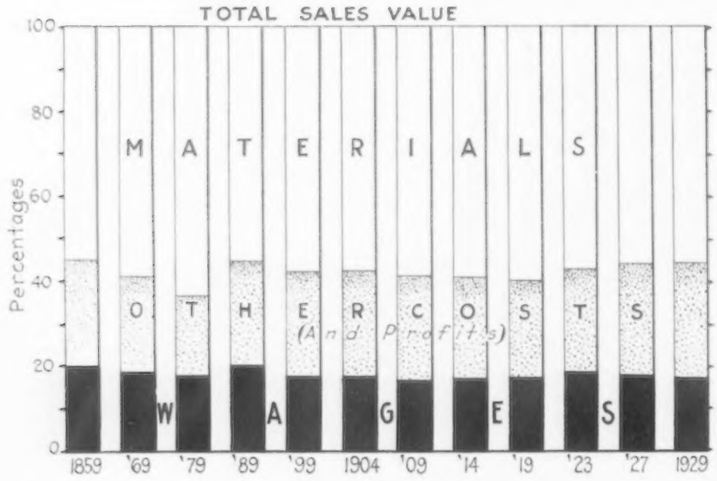
So much has been written of late regarding the devastation among wage earners, of what has been euphemistically called technological unemployment, that it may be interesting to compare the wages paid in industry with the total value of the products of that same industry. The study goes back more than 70 years, to the period prior to the American Civil War.

As shown in the table and diagrams, the total wages paid have varied from 16½ per cent of the value of product to a little more than 20 per cent. There has been only a slight reduction, through the years, of the ratio which the wage earner has received. In fact, in 1909, that percentage was at its very lowest point, while 1923 showed the highest ratio since 1889.

This condition has reacted upon the wage earner in several ways. In the first place, with the growing use of machinery and of labor-saving devices in general, fewer wage earners have been required to turn out a given volume of production. This in turn has resulted in lowering costs below those prevailing under the old order of things and, with the competition for the consumer dollar, has resulted in lowering further the price to the consumer. The most conspicuous example of this, of course, is the much-quoted automobile, the price of which today is far lower than that of a similar car before world prices advanced to their post-war elevation.

While the number of workers turning out a given product has thus been declining, their total wages for making that product have held uniform, or practically so, and the individual wage has shown a distinct tendency to rise (entirely independently of the changed value of the dollar). This fact, with the attendant fact of a lower price for the product, has permitted the wage earner to buy more of the products of industry—has, in a word, raised his standard of living.

It is beside our present purpose to indicate that, whereas the cost of putting in labor-saving equipment has been borne wholly by the manufacturer (capital, in other words), the benefits have been passed on to the wage earner in higher wages on the one hand



How the manufacturer's dollar, received for goods manufactured, has been split—among wages, materials purchased, and other expenses and profits—over a period of three score years and ten.

and, on the other, to the ultimate consumer in a lower price for the product. This does not mean that the manufacturer has not had his benefit also. He has been able to lower his unit overhead costs markedly, to make a much quicker turnover from raw material to shipping platform, and to cut costs in a number of other ways. Thus the benefit has been three-fold —to capital, to labor and to public.

Changes from Nineteenth Century to Twentieth

AS the percentage relation between total wages and value of production, set forth in table on page 1250, shows variations up and down, over the whole period, it may be clarified by grouping the figures into decades. Thus, for 1859 to 1869, the average between 20.09 and 18.33 is 19.21 (per cent). Similarly, for 1869 to 1879 we have 18 per cent. And for 1919 to 1929 the average of six figures gives 17.51 per cent. On this basis it is possible to set up a table which shows some important things very clearly.

Decade	Average Wage Percentage for Decade
1859-1869	19.21
1869-1879	18.0
1879-1889	18.92
1889-1899	18.9
1899-1909	17.28
1909-1919	16.78
1919-1929	17.51

Casual inspection tells us at once that a sharp line of demarcation occurred in this relationship, at about the break of the century. The first four figures average 18.76, and they are fairly uniform. The three last figures, averaging 17.19, are fairly consistent, also. And none in either group would fit into the other group without extending the limits of that group. This break coincided roughly with the beginning of a large employment of electric power in industry.

A similar calculation, taking the totals of the original census figures and then establishing the relationship, gives comparable results. Thus, for the five census dates in the nineteenth century, the total value of products made was 31,421 (millions of dollars), and wages aggregated 5847 (also in millions). Their ratio is 18.61 per cent. For the nine census years in the twentieth century the corresponding figures are 419,-167 and 72,765, giving 17.36 per cent.

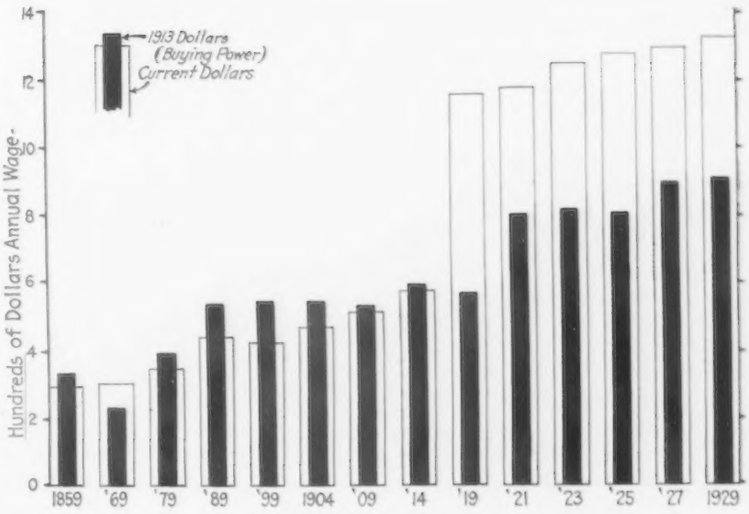
Hence, aside from the one recorded change between the nineteenth century and the twentieth, the wage earners' stipend has maintained a consistently uniform proportion of the total value of industrial output. Since 1900 the trend of the wage percentage has been upward, for the latest decade shows the highest ratio in the twentieth century.

Now as to what wages will buy. It will have been noted that, with the sole exception of 1899, each census

year showed the average wage earner in receipt of a higher yearly wage than ever before. But the purchasing power of a dollar, or of a year's wages, was undergoing continual changes—sometimes, violent ones.

Use of the relations in commodity prices from year to year, as a measure of these changes in buying power, may be challenged on the ground that these prices do not completely represent living costs. But they are, nonetheless, a fair gage of living costs, though they are wholesale (not retail) prices. And the fact that there are no adequate retail price figures, or cost of living figures, except for a brief recent period, makes it necessary to use the wholesale figures, if we are to establish any buying power scale over a period of seven decades.

Hence, the last column in the table shows, on this basis, the average annual wages in American manufacturing plants, expressed in buying power or *real* wages. In this column a sharp rise is noted after 1880 and another after 1920. These appear graphically in the wage chart. Each signalized a new and permanently higher level of real wages. After 1880 that level held, substantially, until after the Armistice, showing a slightly rising, but not uniform, tendency. Since 1920 the same fact is true, of a rising trend on a further elevated level.



Average yearly wages of manufacturing wage earners in the United States, 1859 to 1929, are shown by light lines. The black bars show the changes in buying power of those wages, on the basis of 1913 dollars.

Averaging the yearly averages of 1859 to 1879 we have $317 (in 1913 dollars, or buying power). From 1889 to 1919 the six figures show an average of $552, on the same buying power basis. This means an advance of 74 per cent in the average scale of living, during the 40 years 1880-1920, compared with that prevailing prior to 1880. Again, since 1920, the five census years show an average of $845—in the same "buying power" dollars. Here is a further advance in the American standard of living—insofar as manufacturing wages are an index thereof—in the order of 53 per cent.

Comparing this recent decade with the 30 years covered in the three earliest census figures quoted, the advance in the living scale has been no less than 166

SINCE 1869, the procession of real wages in the United States has continued its steady upward progress. Yet the real cost of manufactured products has as steadily decreased. Let us think twice before reversing a 60-year trend which has so greatly increased consumption.

WAGE EARNINGS IN AMERICAN MANUFACTURING

	Value of Products	Total Wages	Per Cent, Wages to Products	Wage Earners (Thousands)	Average Wage, Year	Commodity Price Index 1913=100	Real Wages, or Buying Power
	(Millions of Dollars)						
1859	1,885.9	378.9	20.09	1,311.2	$ 288.96	89	$ 324.67
1869	3,385.9	620.4	18.33	2,054.0	302.04	130	232.34
1879	5,369.6	948.0	17.66	2,732.6	346.95	88	394.26
1889	9,372.4	1,891.2	20.18	4,251.6	444.88	83	536.00
1899	11,407	2,008.4	17.61	4,712.8	426.14	78	546.33
1904	14,794	2,610.4	17.65	5,468.4	477.39	88	542.50
1909	20,672	3,427.0	16.58	6,615.0	518.10	98	528.67
1914	24,246	4,078.3	16.82	7,036.3	579.66	98	591.50
1919	61,739	10,453	16.93	8,990.0	1,162.90	205	567.27
1921	43,619	8,200	18.80	6,944.0	1,180.85	147	803.30
1923	60,258	10,999	18.25	8,768.0	1,254.40	154	814.55
1925	62,668	10,727	17.12	8,382.0	1,279.75	159	804.88
1927	62,718	10,849	17.30	8,349.8	1,299.15	145	895.97
1929	68,453	11,421	16.68	8,550.3	1,335.75	147	908.67

per cent. That has accounted for the prevalence in the homes of today's wage earners of automobiles, radios and other erstwhile luxuries. And it has brought commissions and individual economists from the four quarters of the earth to learn how it was done.

Trend Steadily Upward

THESE changes have not been without setbacks. But each time there was a setback the next period showed a spurt to a new high level. Thus the 1869 wage, though higher than that of 1859, had nothing like so great a buying power. Post-war inflation of prices—analogous to that of 11 years ago—put a terrible crimp in the employee's pocket book; his pay would buy less than three-fourths as much as the smaller pay of ten years earlier. But by 1879 the combined effect of higher (money) wages and lower prices for what he had to buy put him on the highest level of living he had ever attained.

So it has been since the World War. Wages did not keep pace with mounting prices, between 1914 and 1919. They doubled, but prices more than doubled. Hence the week's envelope would buy less than five years earlier. But here the deficiency in buying power was of the order of only 4 per cent, against a drop of 28 per cent in 1869. And the rebound, immediately after 1919, through average wages continually and uninterruptedly advancing, while prices have fallen sharply, has kept the *real* wage far above anything before known.

Such a temporary decline (in wage buying power) as that in 1925, and those of 1904 and 1909, are mere incidents in the progress of events. A similar recession perhaps will be shown for 1931, when the manufacturing census for this year is compiled.

But the main story of all these figures is that wages not only tend, through the decades, to rise, but that they tend to rise faster than prices. They rise when prices are falling—witness, 1921 and 1927, as well as 1879 and 1889. And they everlastingly hold their gains and consolidate them into bigger ones. The American standard of living has consistently forged ahead.

▲▲▲

A Test of the Drawing Qualities of Sheet Metal

TESTING of sheet metal by deformation under loaded steel balls gives variable results because of frictional effects on the surface of contact. Sometimes rupture occurs on the surface of the cup produced, affording a measure of the strength in all directions, but more frequently the break occurs at the edge of the cup and merely indicates failure under radial tension.

By applying liquid pressure directly to the face of a sheet clamped between circular jaws, Ch. Jovignot (*Revue de Metallurgie*, August, 1930) obtained very consistent results, provided that the sheet itself was uniform. By means of a gage connected to the pressure chamber, rupture was detected instantly, even when the failure was almost invisible in the cup. As the cups were about twice the size ordinarily produced by the ball method, the deformations could be read more exactly. Absence of frictional effects on the working surface insured comparable results. The spherical outline of the cups formed permitted ready graphical solution for the coefficient of extension in all directions and the load of rupture, whatever the thickness of the sheet. In homogeneous material rupture usually occurred at the summit of the sphere, extension being greatest at that point. Steel ball instruments may be converted into the liquid pressure type with little difficulty. The results obtained by the method are of considerable industrial importance.

"SLOW DRAW" MOTION INCREASES CRANK PRESS OPERATING SPEEDS

By WILLIAM P. BLAKE
E. W. Bliss Co., Brooklyn

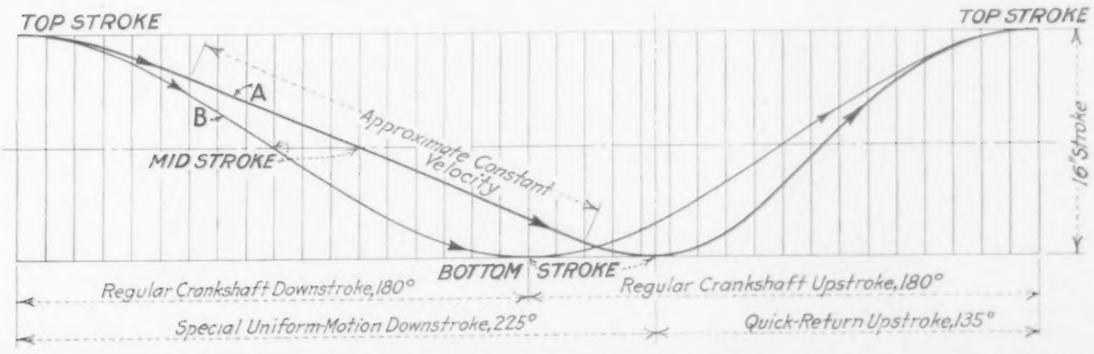
RECENT developments in the power press field include a modified Whitworth motion which, applied to crank presses, produces uniform velocity of the punch on the downstroke and a quick return on the upstroke. The practical outcome of this development relates both to marked increase in speed and greater accuracy, as explained by Mr. Blake, in this article.

Furthermore, it adapts the crank-type press, with its simpler construction and more rapid operation, for redrawing, broaching and burnishing operations usually done on other types of equipment.

TO redraw long shells at a maximum and, at the same time, uniform speed; and to broach and burnish bushings more accurately, at a uniform rate and at faster speeds than at present attainable, a new crank motion has been patented and introduced by E. W. Bliss Co., Brooklyn. This mechanism replaces the simple harmonic motion of the regular crank with a modified Whitworth motion which brings the press slide down with an approximately uniform velocity over the greater part of the down stroke and imparts a quick return on the upstroke. The length of this stroke can be as accurately and easily set and controlled as on the regular crank presses.

This new slide motion makes possible the use of crank presses—with their inherent advantages of simplicity of construction and greater speeds—for much redrawing, broaching and burnishing work that is now being done more slowly in rack and pinion presses and other types of equipment. It is paradoxical that, in addition, this uniform-velocity "slow draw" mechanism may also be used to speed up many drawing operations now being done with simple harmonic motion in a regular crank press.

The displacement curves reproduced herewith illustrate the differences in motions and velocities of two slides actuated by the two different crank mechanisms while operating at the same number of strokes per minute and over the same length of stroke. Curve *A* is the motion imparted by the new constant-velocity mechanism. For the greater part of the downstroke, above as well as below mid-stroke, the speed of the slide is very nearly constant, as indicated by the uniform slope of the curve. The quick return on the upstroke brings the slide to top position at the end of the same time-interval

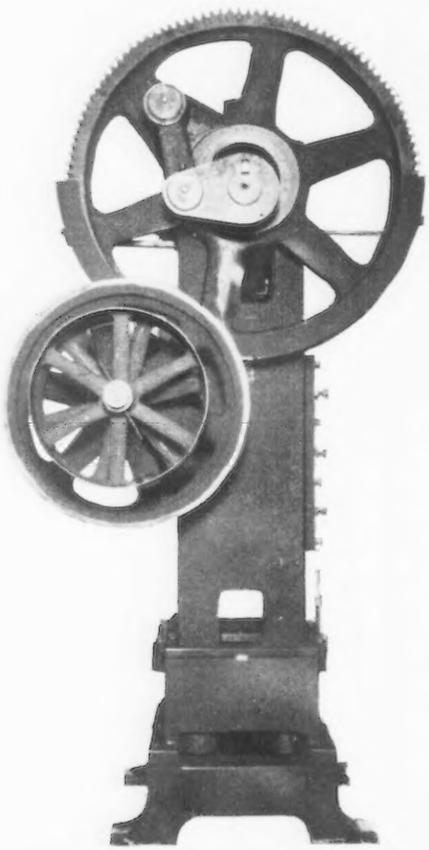


Displacement curves of two slides having the same length of stroke. Curve B is the simple harmonic motion imparted by the regular crank. Curve A shows the approximately constant velocity motion on the downstroke and the quick return of the slide on the upstroke obtained with the "slow-draw" drive mechanism.

as that in which the regular crank mechanism makes one complete cycle with simple harmonic motion. (Curve *B*.)

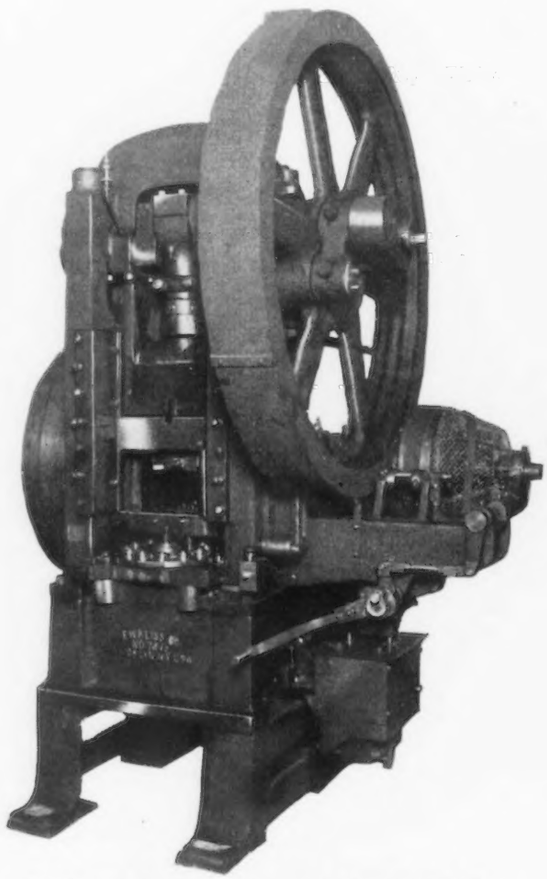
The maximum downstroke velocity of each slide is at the mid-position, as indicated by the greater slope of the two curves at that point. It will be noted that though each curve completes the cycle in the same interval of time, the regular crank press, besides having non-uniform motion, causes the slide to travel faster at mid-stroke than does the slide actuated by the "uniform-velocity" mechanism.

At mid-stroke, the speed of the slide with simple harmonic motion—with a 16-in. stroke and operating at 15 strokes a minute—would be 62.8 ft. a minute. This would be beyond the limit of the maximum speed at which most steels can be drawn without the shell "picking up" on the dies. Under identical conditions, as evidenced by the curves, the velocity of the slide moving down with the approximately constant speed of the "slow draw" mechanism would be about 34 ft. a minute. Besides being uniform this speed would be conservative for drawing steel shells and would be maintained over a greater portion of the downstroke. With this special crank motion, therefore, and, under the conditions shown in the displacement chart, the operating speed of the press could be increased from 15 up to 27 strokes a minute without increasing the maximum drawing speed above 62.8 ft. a minute, which is the drawing speed at mid-stroke of the regular crank motion when operating at 15 strokes a minute.



"Slow-draw crank mechanism applied to a Bliss No. 306 straight-sided press.

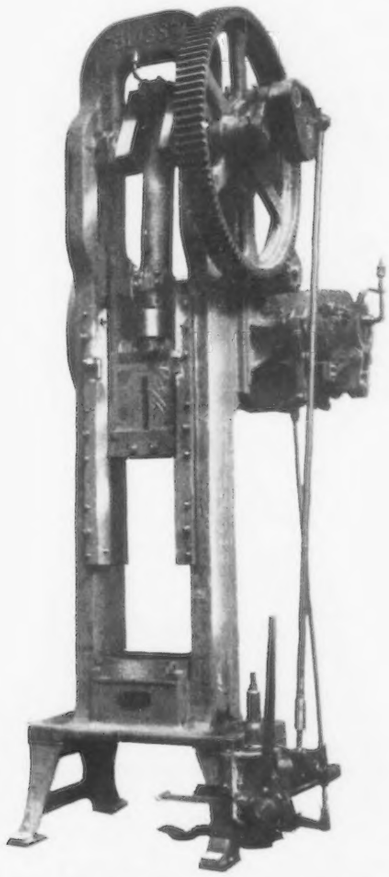
From the comparative velocities, as indicated by the slopes of the two curves, we can predict, therefore, that the redrawing of long shells and the broaching and burnishing of bushings in presses equipped with the "slow draw" mechanism can be safely speeded up about 70 to 80 per cent above the number of strokes per minute possible in regular crank presses. This increase would be, in the case cited, up to about the maximum speed at which the shells can be fed by hand. Where production requirements warrant high-speed automatic operation, this same mechanism may be used to speed up work



On this press, used for broaching bronze bushings, the "slow-draw" mechanism provides a constant-velocity downstroke. The length of stroke is 9 in. A 12-station ratchet dial feed automatically places the bushings in position under the broaching tool.

to a point where mechanical feeding can be very profitably employed.

The best available figures (data on the subject are admittedly incomplete) show that under favorable conditions steel shells have been drawn at speeds as high as 60 ft. a minute. This was the speed of a regular crank and the slide at mid-stroke position. Here the downward component of the peripheral speed of the crankpin is equal to this tangential speed and is, of course, at its maximum value. Somewhat beyond this point at a speed only slightly less than this maximum the punch enters the shell or hits the blank and starts the redrawing (or



The uniform velocity downstroke obtained with the "slow-draw" drive is used with marked success in redrawing long, thin-walled copper shells for thermostats. This press has a 24-in. stroke and operates at 25 strokes a minute.

drawing) operation. A more conservative value for the maximum drawing speed of steel, commonly used for estimating purposes, is 50 strokes a minute. A large concern in Connecticut, drawing brass shells, has been able to get speeds as high as 200 ft. a minute, with some reports as great as 260 ft. a minute on that metal, with exceptionally close control over the operation due to long familiarity with that class of work.

When it is considered that the speed at which steel wire is drawn is of the order of 2500 ft. a minute, and that in testing steel (cold) the percentage of elongation increases with the speed of the test, it would seem that the present limit on drawing speeds is more a matter of the sudden start as the punch hits the blank or shell. At this point of the stroke the velocity of the punch is at a maximum for the period of the draw. Tests indicate that "the comparative resistance to drawing, set up in the flange of a (partially drawn) shell is not any greater due to a higher drawing speed. But with a given starting resistance, made up, say, of a severe draw, too sharp corners on punch and draw die, and too high an initial blankholding pressure, an increase in the suddenness with which the metal is started moving should increase the tensile strain on the metal around the nose of the punch."* This phenomenon would increase the tendency of the metal to fail at that point.

Modern practice has demonstrated that the application of a smooth, even pressure will increase the quality and cut down the breakage of drawn shells. For broaching and burnishing operations such a constant-velocity motion has long been recognized as increasing the speed and accuracy of the work. The new "slow draw" drive makes possible the use of just such an even pressure at the greater speeds required for more economical production.

*E. V. Crane—"Press Working and Forming of Metals," *Metal Stampings*, January, 1930.

▲▲▲

Copper Steel for Dynamo and Transformer Sheets

TRANSFORMER steel containing about 4 per cent silicon has little resistance to atmospheric corrosion. As small additions of copper improve the weather resistance of structural steels, A. Kussmann, B. Scharnow, and W. Messkin (*Stahl und Eisen*, Aug. 21, 1930) have studied the influence of copper on the magnetic properties of silicon steels. Melts of 1.5 and 4 per cent silicon steel were made in a high-frequency furnace and 0.2 to 4 per cent copper was added. These ½-lb. melts were cast in iron molds, and forged to cylindrical rods at 1800 deg. F. No drawbacks due to copper were apparent in the hot working.

The 7-in. x ¼-in. diameter rods for magnetic measurements were slowly cooled after 7 hr. annealing at 1600 deg. In the field of solid solution, up to about 0.8 per cent copper in 1.5 per cent silicon or 0.6 per cent copper in 4 per cent silicon steel, the coercive force, as measured by a magnetometer, is practically the same as in the copper-free material, but above the solubility limit the coercive force increases sharply with increasing copper content, and the hysteresis loss becomes greater. The magnetic induction and the electrical resistance were practically unaffected by the copper additions.

Corrosion resistance was tested by treatment of the polished specimens, with and without annealing, in 5 per cent and 25 per cent sulphuric acid at ordinary temperature. In the 1.5 per cent silicon dynamo steel, 0.2 per cent copper produced a remarkable improvement in corrosion resistance which remained constant for further additions; in the 4 per cent silicon transformer iron about 0.4 per cent copper was necessary for maximum corrosion resistance in the annealed condition, and susceptibility to acid attack increased again on further addition. The corrosion resistance is satisfactory at 0.5 per cent copper in both steels, at which content the electric and magnetic properties are not impaired. The Rockwell hardness increased about 10 per cent as the copper content increased from 0 to 1 per cent, and the tensile strength lay within the usual limits for the dynamo steel.

DESIGN OF OPEN-HEARTH PORTS

PROPER design of open-hearth ports has frequently been considered of late, owing to the great number of new patents in this field and to the growing use of gases other and richer than producer gas. It may be of interest to summarize what has been done along this line recently, and thus to prevent the repetition of mistakes in the future.

The most essential part of a furnace is its combustion chamber, in the case of solid fuel, and its burner, in the case of liquid or gaseous fuel. The burners of the open-hearth furnace are their port ends. The importance of the proper design of the ports is evident from the fact that the time of a furnace campaign depends mostly on their condition and the furnace melts properly so long as their condition is good.

Before comparing the different types of ports, we must consider some fundamental principles for such a comparison; that is, to define the conditions of the heat transfer from the hotter flame to the cooler metal and slag.

Methods of Heat Transfer

It is well known that heat is transferred mainly in two ways: by radiation and by convection.

In the first case two kinds of radiation are to be considered: Radiation of the gas itself or, more exactly expressed, of the products of combustion, chiefly carbon dioxide and water vapors; radiation of the solid particles, mostly glowing carbon particles which are suspended in the luminous flame.

The question of the radiation of the gases themselves was thoroughly investigated by A. Schack and reported in Mitteilungen der Wärmestelle des Vereines Deutscher Eisenhüttenleute, No. 55, Düsseldorf, Germany.

The question whether convection or radiation is predominant in the heat transfer from the flame to the bath of the open-hearth is interesting, but we cannot follow here all the history of the discussion of radiation vs. convection. The theoretical point of view is based chiefly on Stefan Bolzmann's law, which runs thus:

$$Q = A\left\{\left(\frac{T_1}{100}\right)^4 - \left(\frac{T_2}{100}\right)^4\right\}$$

According to this law, the amount of heat transferred by radiation is directly proportional to the difference of the fourth powers of the absolute temperatures of the bodies in question, and will therefore predominate at high temperatures. But in any case certain experiences do not correspond with this point of view.

We know, for instance, that the metal bath begins to boil at first at the point where it comes into contact with the stream of furnace flame. Besides this, the melting down of the parts of brickwork which are washed by the flame is also a known fact. Such experiences are evidence in favor of the convective heat transmission and are to be taken into consideration.

The influence of flame luminosity was clearly estimated by Lent and Aye as follows: "The flame filled with particles of soot, and consequently luminous, has a lower temperature but greater radiation than a non-luminous flame, assuming that all other conditions are the same."

Fundamentals of Port Design

Basing upon this statement we can assume that, by making the flame luminous, we would promote radiation but eliminate the convective heat transmission, due to the lowering of the flame temperature. Without going into details we can state the following:

1. Apart from the relative value of convective heat transfer, the design of the ports must be such as: (a) To cause an intimate contact of the flame with the bath; (b) provide as large a contact surface as possible; (c) this contact must be in the right place, i.e., where the flame has the highest temperature.

2. We must endeavor to get a higher velocity of the flame, thus effecting convective heat transfer and at the same time a higher flame temperature, due to the more intensive burning process.

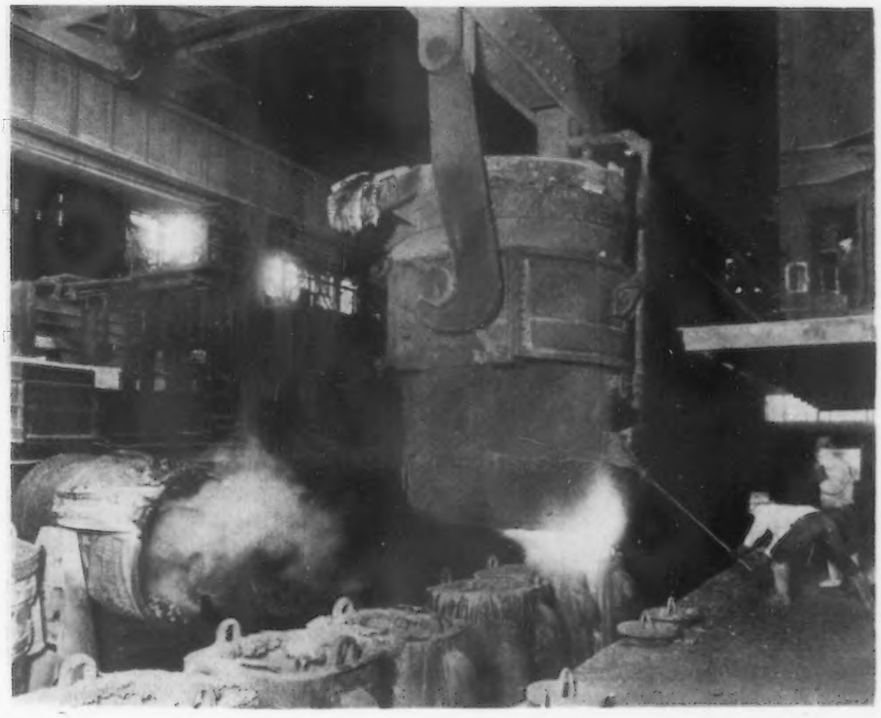
3. The slope (inclination) of the flame stream must be fitted to the shape of the bath. For long and narrow furnaces the angle will be smaller than for wide and short ones.

4. The most important direction is the direction of that element (gas or air) which has the highest velocity.

Ports of Common Type

IN his valuable articles, "Dimensions of Open-Hearth Furnaces Estimated on Empirical Data," Prof. M. A. Pavlov gives the average inclination of the gas ports at 12 to 18 deg. Some German authors recommend 15 to 20 deg. (H. Bansen-Abmessungen und Leistungen, Deutscher Siemens-Martin Öfen). The difference is not great, considering that the exact slope

By V. BALABANOV,
Pilsen, Czechoslovakia



(inclination) is further estimated after the furnace has made a campaign, because it depends on the process in question and the shape of the hearth.

In fact, when looking from above on the flame (for instance on the flame of a welding burner) directed obliquely on a horizontal plane, we can see that the hottest part of the surface would be oval. (See Fig. 1.) The greater the angle α the broader and shorter that oval will be. Angle α being 90 deg., the oval is converted into a circle. Approximately the same occurrence takes place in the open-hearth furnace. Suppose we have established $\alpha = 15$ deg. and during the operation of the furnace we noticed that the flame melts the side walls, and at the same time is too short. Then it is evident that the angle must be diminished.

Both the gas and the air ports usually are made narrower (conical) toward the furnace bath. This is theoretically correct, because the pressure of the gases (velocity head) is to be converted into velocity according to the formula: $v = \sqrt{\frac{2gh}{\gamma}}$ where g is the gravity acceleration and γ the specific weight of the gases. But actually this conical shape is very slight, and the angle between the arch and the bottom of the port does not exceed 2 to 4 deg.

This can be explained by the burning out of the flues. If the conical shape were larger, the area of the flues would be increased too greatly and the correct direction of the flame would be disturbed.

Using Two Ports for Entering Gas

Large open-hearth furnaces sometimes are given two gas ports on each side. In this case the proper direction of the flame may be attained by inclining both ports slightly toward the center line of the furnace. The shape of the flame then will conform more to the shape of the furnace hearth than in the case of parallel ports, and thus convective heat transfer will be favored.

We must bear in mind that the gas stream flowing from the ports into the melting chamber of the furnace has a tendency to drop, because the gas is heated in the regenerators to only 1100 deg. C. and is therefore heavier than the furnace atmosphere, which has a temperature of about 1700 deg. C. Exceptions to this phenomenon can happen only when the furnace is comparatively cold, as for instance during the charging period.

What we are calling the flame is only a thin, luminous cover of the gas stream. It cannot change considerably the specific weight of this stream. We can compare this flame to a bag of comparatively cold gas having a hot cover.

The tendency of the gas to drop can be clearly seen in large furnaces with deep hearths, for instance when sintering a new bottom. The burning of the gases in our case represents a surface reaction, while the shape and the dimension of this surface approximately corresponds to the condition and the dimensions of the flame.

Conditions With Steady Burning

Supposing that under definite conditions the intensity of the burning reaction remains constant, we come to the following conclusions:

The relation of the flame surface to the amount of gas each second is constant.

It follows then that, for a given cross-section of the ports, the flame will be shorter if the velocity of the gas stream is being diminished. The opposite conclusion will be right only in a limited sense, for

the intensity of combustion will be rapidly increased when the whirlwind region is reached (turbulence).

It is evident that every increase of combustion intensity will cause a shortening of the flame, whatever the cause may be. This can sometimes be observed in large furnaces with high regenerators and with narrow ports, when the furnace is running very hot. The flame in this case is getting shorter and transparent and begins to hum, i.e., it makes a

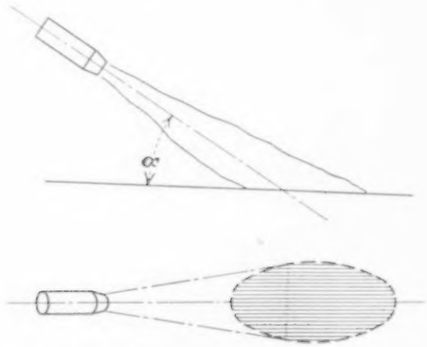


Fig. 1.—Shape assumed by a flame from a burner, impinging at an acute angle upon a bath of steel.

peculiar noise typical of the whirlwind region (turbulence).

Modern theory attributes to the luminosity of the flame a great influence upon the heat transfer, and by this token the increase of flame transparency mentioned should have an unfavorable effect. But in fact, in all such cases, a rapid heating of the bath is noticed.

Basing on similar facts, observed also on other kinds of furnaces, the author, who acknowledges wholly the importance of radiation, nevertheless is of the opinion that the influence of convective heat transfer is often neglected. But at the same time it is evident that, if we use non-luminous gas in a furnace built for a luminous fuel, the result will be a diminishing of the heat transfer. It can be increased only by designing a special burner with greater convective heat transfer.

From all that has been said above, we can draw the conclusion that every port should have such a shape and inclination as to increase the convective heat transfer as much as possible.

Velocity of Gases Passing Through the Ports

WE are now going to estimate the velocity of gases in the ports. First of all we must point out that, by increasing this velocity, *we do not shorten the time* during which the gases remain in the furnace chamber. To illustrate this an example of an annealing furnace is shown (Fig. 2). The gas and air ports of this furnace enter the chamber from below; the air ports are placed between the gas ports and parallel to them.

If the velocity of the entering air or of the gas is not too high, we do not see any perceptible motion of the furnace atmosphere. By raising this velocity—usually over 10 or 12 meters (33 to 39 ft.) a second—circulation of this atmosphere can be noticed, as shown by the arrows.

This phenomenon explains the influence of increasing the velocity of the entering gases. The time during which the gases remain in the furnace depends only on the amount of the gas and air per second and not on their velocity. The circulation of the furnace atmosphere increases the convective heat transfer and distributes the heat in the furnace more uniformly.

The same rule is true also in open-hearth furnaces, for the tongues of flame which we can see represent the near ends of the turbulence rings. We cannot see the whole picture of the gas movement, because it is invisible; only the moment during which the carbon of the gases is burning can be noticed.

We have suggested that the flame can be compared to a bag of comparatively cold gas with a thin, burning envelope. By increasing the velocity of the gas stream, we may simultaneously give such a shape to the flame (for instance, by decreasing its height) that the surface of the convective heat transfer remains undiminished. Therefore we do not need to fear a bad effect in this respect.

Considering all these circumstances it is evident that increasing the gas velocity will give us the following advantages:

1. An increased reaction of combustion.

2. A better convective heat transfer from the flame to the metal bath.

Velocity of Open-Hearth Furnace Gases

Now we shall estimate the velocities of gases used in open-hearth furnaces of standard design.

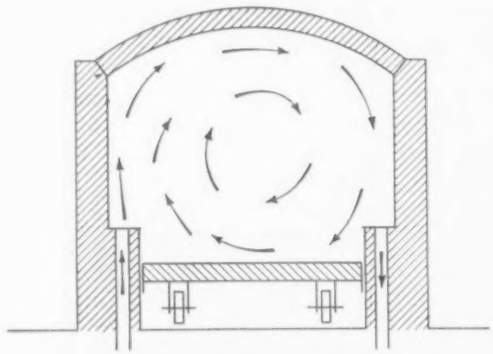


Fig. 2.—Circulation of furnace atmosphere when the velocity of entering gases is raised.

Prof. M. A. Pavlov in his book recommends for a 30-ton furnace a cross-section of gas ports of about 3500 sq. cm. (540 sq. in.). Such a furnace has a producer gas consumption of 1000 cubic meters (35,000 cu. ft.) per ton of charge.

Taking the gas temperature in question as 1100 deg. C. (1373 deg. C. absolute), and the time required for one heat 8 hr., the volume of gas per second will be:

$$V_{1100^\circ\ C.} = \frac{1000 \times 30 \times 1373}{8 \times 3600 \times 273} = 5.24 \text{ cubic meters}$$

(185 cu. ft.)

and the corresponding velocity of the gas:

CONSIDERATIONS of the velocity and volume of gases used as fuels in an open-hearth furnace, and of the velocity and volume of the waste products of combustion going to the stack, influence materially the design of the ports for directing the fuel above the bath and for removing the products of combustion.

The angle which these ports shall take and the cross-sectional area which they shall have depend upon a nice balancing, and the factors arising from the incoming and the outgoing flow. In this article the author ties up theoretical considerations with practical observations on operating furnaces, and shows how a number of the calculations are made.

$S = 524 \div 0.3500 = 15$ meters (49 ft.) a second

Such velocities were really adopted within recent years, but practice has shown the advantages of an increase in these values and the latest reports of the Union of German Metallurgists (Verein deutscher Eisenhüttenleute) estimates the velocity of gas at 0 deg. and 760 mm. (atmospheric) pressure at 6 meters (19.5 ft.) a second, which will be, for the real velocity (at 1100 deg. C.),

$$V_{1100^\circ} = \frac{6 \times 1373}{273} = 30 \text{ meters (98 ft.) a second}$$

This value corresponds with the new velocity of Prof. M. A. Pavlov published in 1927 (see "Dimensions of the 100-Ton Open-Hearth."—*Stahl und Eisen*, 1927, No. 23). In this investigation Professor Pavlov defines the velocity of smoke in the ports (at 1600 deg. C.) as 32 meters (105 ft.) a second. We shall see later that the difference between this velocity and the velocity of gas of combustion is very small.

Most Ports Have Dual Function

In ports of ordinary design, the velocity of the gas is very difficult to increase, for the gas port acts at the same time as the flue for the products of combustion leading to the gas regenerator chamber. An increase of the gas velocity will therefore lead to an increase of the velocity of escaping gases of combustion in the gas port, which in turn would require a very tall chimney or the use of forced draft; otherwise the gas chamber would remain cold.

We must also not forget that both sides of an open-hearth furnace must be well balanced, because the hearth itself, having many openings, is connected with the atmosphere. Consequently the pressure or draft on one side of the furnace actually does not influence the pressure or draft on the other side. (See Dichmann, "Der basische Herdofenprocess").

Having increased the draft of the chimney, we must also increase the draft of the air chamber, for instance by deepening it or by the use of an air blast. For reasons which will be considered later, we may adopt for the air a smaller velocity than for the gas. That allows us to make the air ports larger, and to make a correct distribution of the gases of combustion by separate flues for air and gas, equipped with dampers.

In any case the maximum velocity of the flue gas stream must be in accordance with the chimney draft.

In the above mentioned German report, the average height of the chimney is 60 meters (197 ft.). Taking the average temperature in it at 300 deg. C. (537 deg. absolute) and the specific weight of waste gases 1.35 kg. to the cubic meter (0.084 lb. to the cubic foot) we find that the static draft at the bottom will be

$$h = \left(1.35 - 1.35 \times \frac{273}{573}\right) \times 60 = 52.4 \text{ mm. (2.06 in.)}$$

of water.

According to the results of many investigations, the measured draft at the bottom of chimneys almost never exceeds 30 mm. (1.18 in.) of water. But this measured draft represents nothing else than the sum of all resistances from the hearth to the point of measurement. For the velocity head, therefore, we have:

$52.4 - 30 = 22.4$ mm. (0.88 in.) of water

The average temperature of escaping gases in the ports is 1600 deg. C. and the corresponding velocity is:

$$v = 0.7\sqrt{\frac{19.6 \times 22.4 \times 1873}{1.35 \times 273}} = 33 \text{ meters (108 ft.)}$$

a second.

The following calculation shows whether this velocity is in accordance with practice:

The amount of escaping gases for the producer gas furnace is 2170 kg. (4780 lb.) for each 1000 calories in the gas and the corresponding amount of air is 1130 kg. or 2490 lb. (H. Bansen, "Bau und Berechnung der Siemens-Martin Öfen," *Stahl und Eisen*, 1925, page 705).

According to the German report the relation of the volumes of the chamber is:

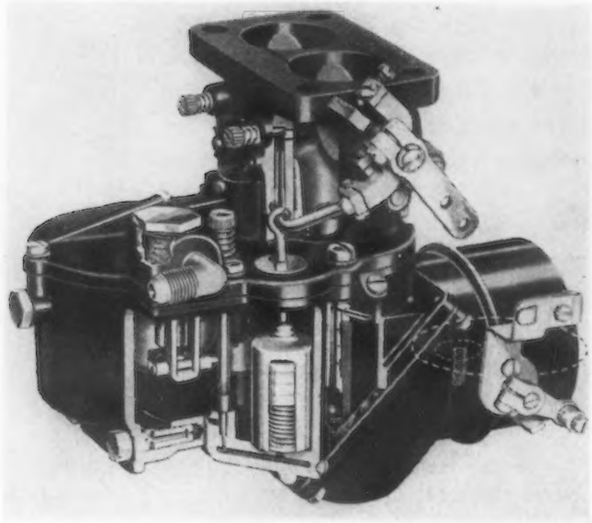
$$V_{\text{gas chamber}} : V_{\text{air chamber}} = 1 : 1.25$$

Assuming that this relation corresponds to the loadings of the chambers, the corresponding amount of waste gases passing through the gas chamber is:

$\frac{1.8 \times 1.0}{2.25} = 0.8$ cubic meter for each cubic meter of gas burned.

Taking as above the temperature of gas and of

(*Concluded on page* 1273)



WASTE MOTION

By ROGERS A. FISKE

RAW materials, molten metal, molds and castings are handled mechanically in the new foundry of the Bendix Stromberg Carburetor Co., South Bend, Ind. Crane runway, monorail, conveyors and aisles have all been so placed that work takes the shortest and most direct route, with no back-tracking. Both iron and non-ferrous metals are cast, all the iron used being melted in an electric furnace.

MANY specifications for carbureters now call for bodies made of cast iron instead of non-ferrous metals. In most designs there are complications, such as heavy flanges and bosses, as well as wall thicknesses that often do not exceed ⅛ in. A new foundry designed specifically for this class of work, as well as for the pouring of non-ferrous metals, has been constructed by the Bendix Stromberg Carburetor Co., South Bend, Ind. An outstanding as well as unusual feature of the plant is the fact that the iron is melted in an electric arc furnace.

No Doubling Back of Work

The general layout of the foundry is such that there is no doubling back of work in process. Raw materials are brought to a special department in railroad cars. The switch track, which enters the side of the foundry building near one end, extends the full length of the storage and furnace department. Overhead is a 5-ton electric crane, furnished by the Shepard-Niles Crane & Hoist Corpn., Montour Falls, N. Y., by means of which material is moved from cars to storage. The electric furnace is charged with the aid of this crane.

At the entering end of the materials department are three scrap storage pits, then a platform on which is mounted the electric melting furnace. The transformer room is next in line, followed by the sand storage bins and sand preparation space. The remainder of this section of the building is occupied by brass and aluminum melting furnaces.

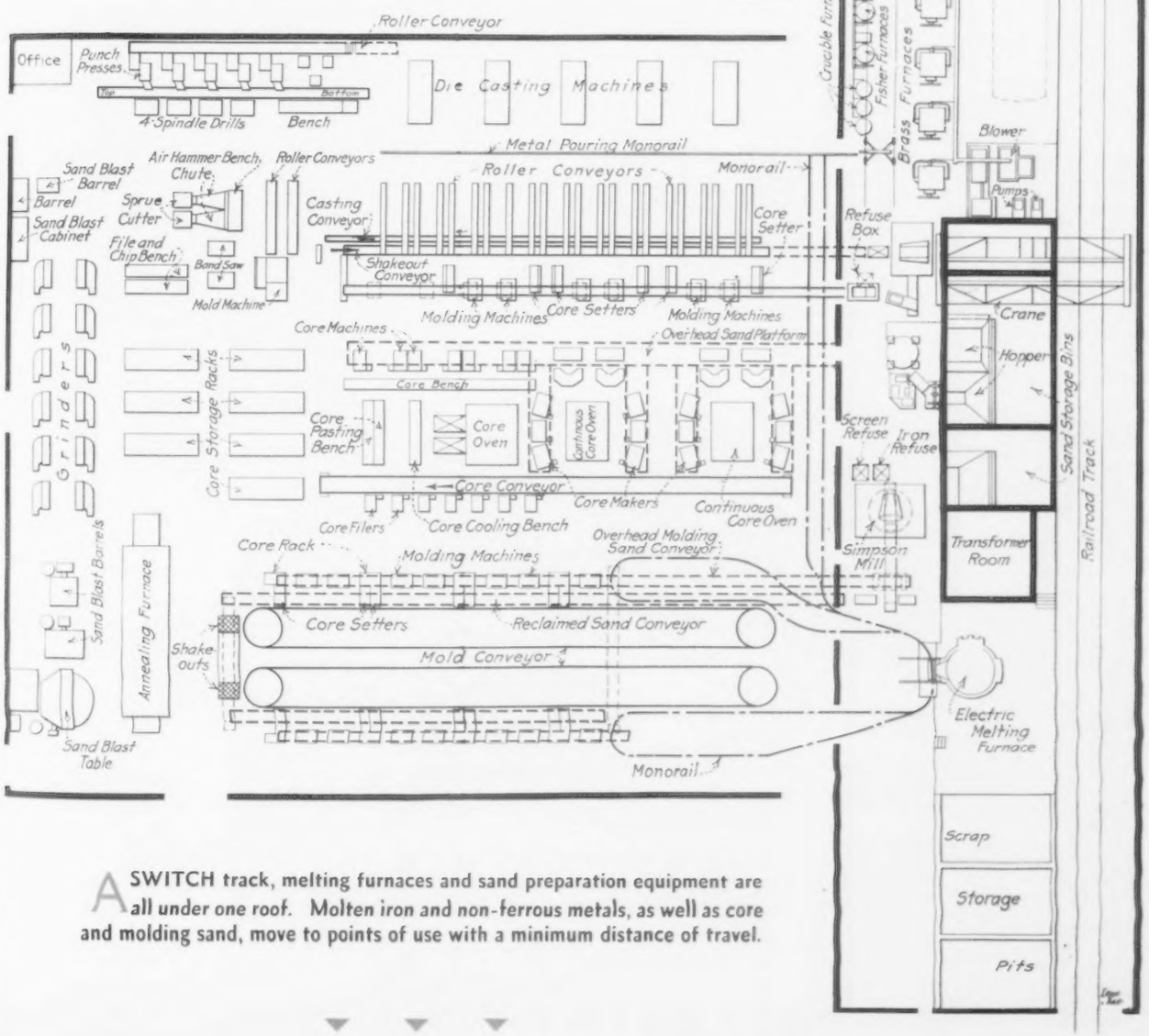
This plan provides for an iron pouring floor directly in front of the electric melting furnace, a core-making department in front of the sand storage and preparation sections, and a non-ferrous casting floor opposite the brass and aluminum furnaces. Therefore hot metal and sand are moved a minimum distance, and the core-making floor, being located between the ferrous and non-ferrous molding stations, feeds conveniently to either side.

Molding sand is unloaded from railroad cars by the crane bucket to overhead storage bins. Core sand, after having been prepared, is loaded on a conveyor from which it is plowed to overhead bins at core makers' stations.

At the end of each of two continuous mold conveyors, which are installed only on the ferrous side of the foundry, there is a vibrating screen where the sand is shaken from drags and copes through a screen plate on to a sand-reclaiming conveyor which is located beneath the foundry floor. This conveyor discharges the reclaimed sand to a belt conveyor which runs lengthwise of the continuous mold conveyor unit. This sand is delivered to the reclamation room, where it is screened, tempered and prepared in a Simpson mill, manufactured by the National Engineering Co., Chicago. It is then elevated to a revivifier, where it is put through a heating and aerating process, following which it is finally raised

ELIMINATED IN CONVEYORIZED FOUNDRY

to a conveyor which delivers the prepared sand to overhead bins located above the molding machines. These machines, which are located along the molding side of each continuous mold conveyor, are of the jolt-squeeze type, made by William H. Nicholls Co., Inc., Brooklyn, N. Y. Sand-handling and mold



A SWITCH track, melting furnaces and sand preparation equipment are all under one roof. Molten iron and non-ferrous metals, as well as core and molding sand, move to points of use with a minimum distance of travel.

conveyor equipment was furnished by the Link-Belt Co., Chicago.

Molding Machines Feed Mold Conveyor

Seven molding machines have been placed along one side of each continuous mold conveyor. Four machines are required to keep the conveyor loaded to capacity and three machines are held in reserve, either as spares in the event of breakdown or for use when pattern changes are being made. Cores are delivered to coresetters who are located in the center of the mold conveyor. These men set the cores in the drag half of the mold while it is being conveyed toward the cope machines.

Patterns are placed on the molding machines so that the first three machines are used for making drag molds and the remainder of the machines are used for producing copes. This arrangement allows time for core setting before the drag half of a mold reaches the cope machines. The usual arrangement is to pair up machines, as for instance, No. 1 and No. 4, No. 2 and No. 5, etc.

After a cope is placed on a drag, a man also working in the center of the mold conveyor applies the wedge clamps. The remaining stretch of mold conveyor on this side is designated as the pouring station. Molds then take the turn of the conveyor and cool while passing down the return line to the shakeout station, which is at the opposite end of the conveyor from the pouring station. The two mold conveyors are placed "back to back," that is, the molding stations are on the outside runs.

Each molder receives flasks on the continuous conveyor, sets them on his machine and pulls a hand lever above him for sand, which is discharged from an overhead storage bin. He makes his half of the mold which he then places on the conveyor. The four molding machines that are in regular use on each line are now producing a total of from 1500 to 1700 molds in a 9-hr. day, this being equivalent to 750 to 850 molds a day per pair of machines. Plans are already under way to increase this output.

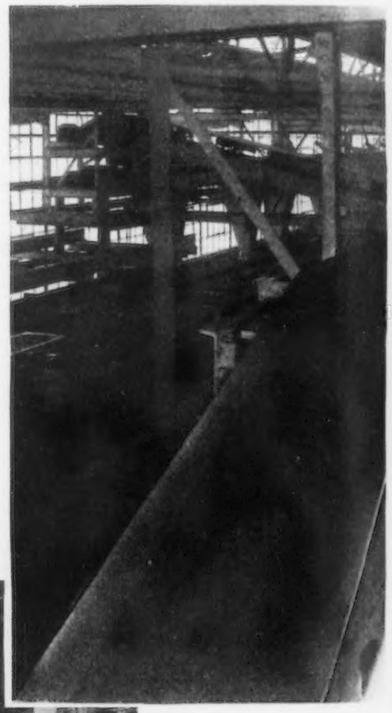
Roller Mold Conveyors in Non-Ferrous Department

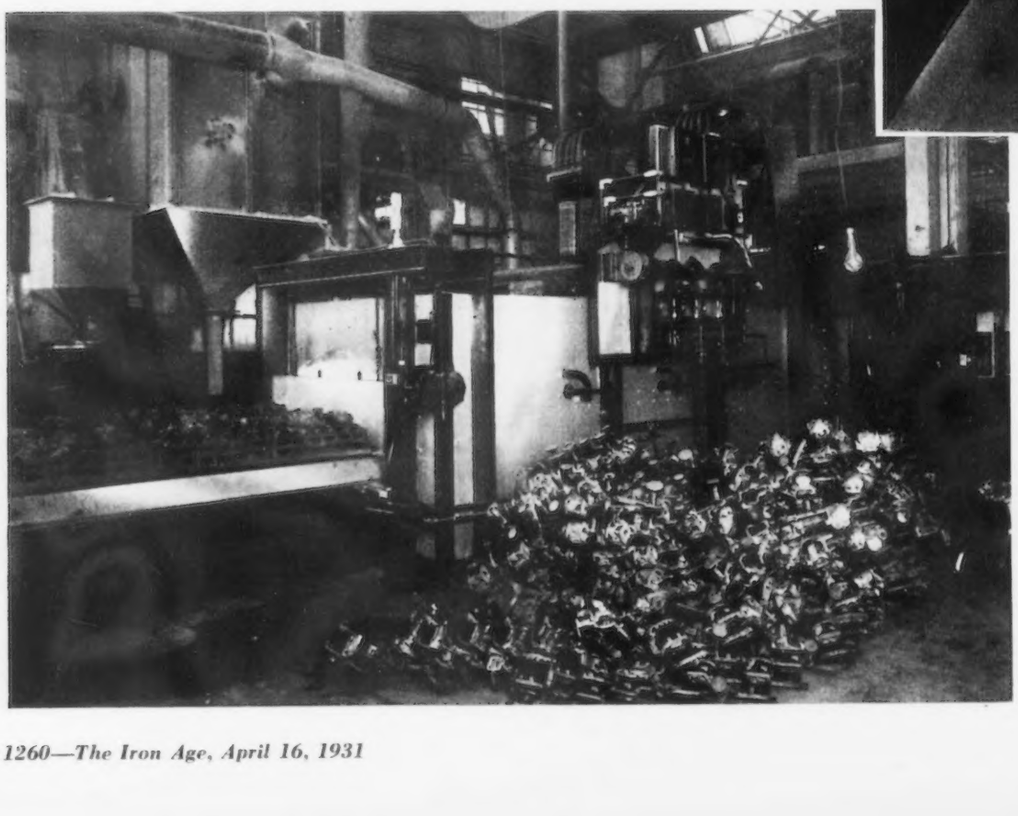
The molding sand for the brass side of the foundry is prepared by adding water in a paddle mixer, passing the sand through an aerator from which it is conveyed overhead to hoppers above the molding stations. Metal in the non-ferrous department is melted in three oil-fired W. S. Rockwell Co., New York, reverberatory furnaces and in four Alfred Fisher, Cicero, Ill., crucible-type furnaces. In the non-ferrous section of the foundry the molds are poured on roller conveyors furnished by the Lamson

▲ ▲ ▲

A BELT conveyor distributes sand from the sand preparation department to overhead bins at molding stations.

▼ ▼ ▼

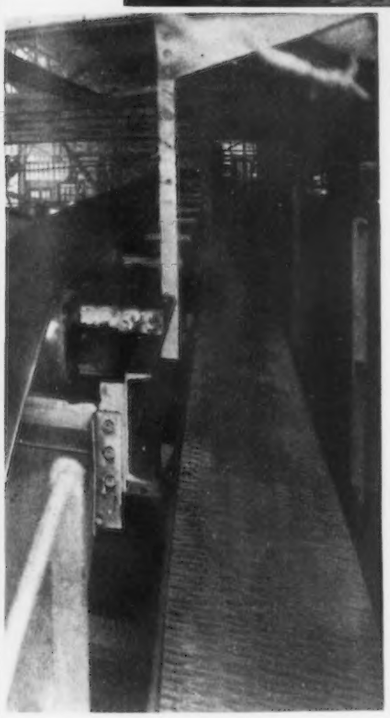




▲ ▲ ▲

ALL iron castings are annealed in an electric furnace.

▼ ▼ ▼



A SHAKEOUT screen is located at the end of each mold conveyor (above).

Co., Inc., Syracuse, N. Y. Other conveyor units in this department were made and installed by the Link-Belt Co.

On the iron side of the sand preparation department is a thoroughly equipped laboratory. Frequent tests of the sand as it is prepared are made there.

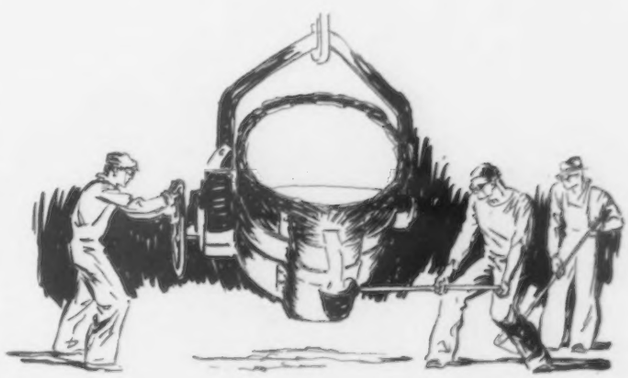
Conveyors Move Cores to Filer Stations

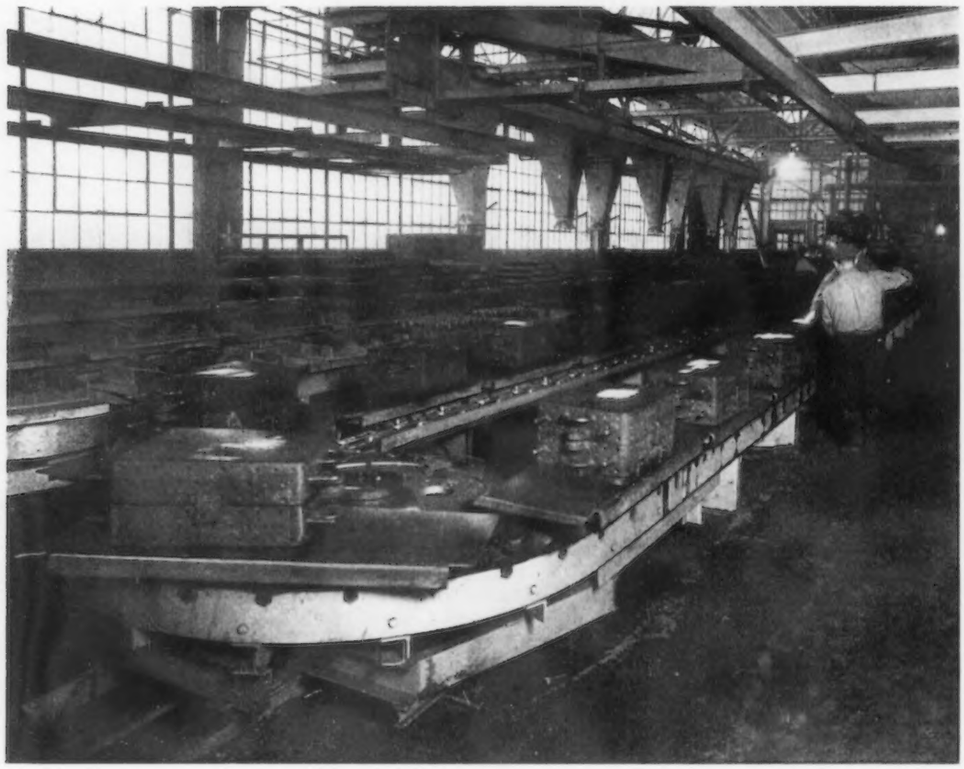
Core-baking equipment consists of two vertical gas-fired conveyor ovens and a drawer type oven, all of which were made by the Foundry Equipment Co., Cleveland. Opposite each continuous core oven is a William Demmler & Brothers, Kewanee, Ill., core machine and at convenient points around the three core ovens are core benches. On one side of the core oven is a conveyor which delivers cores to filer stations and to the core pasting benches. From there the cores are moved only a short distance to storage racks, which are conveniently located with respect to the core setters' racks at stations along the lines of the continuous mold conveyors and on the non-ferrous floor.

Metal Tapped Each Hour from Electric Furnace

The mixture used in the electric furnace, which was furnished by the Pittsburgh Electric Furnace Co., Pittsburgh, consists of pig iron, foundry scrap, cast scrap, and low phosphorus scrap steel. Gates and risers, after having been knocked off at the shakeout station, are transported by truck to one of the scrap storage pits, which are constructed of concrete and extend below the floor of the storage room. These pits are under the 5-ton crane which, as has been pointed out, also serves the material switch track. Cast scrap and gates and risers from the foundry are stored in one bin. Pig iron and low phosphorus steel are stored in a second bin, and the third pit is used for purchased cast stock.

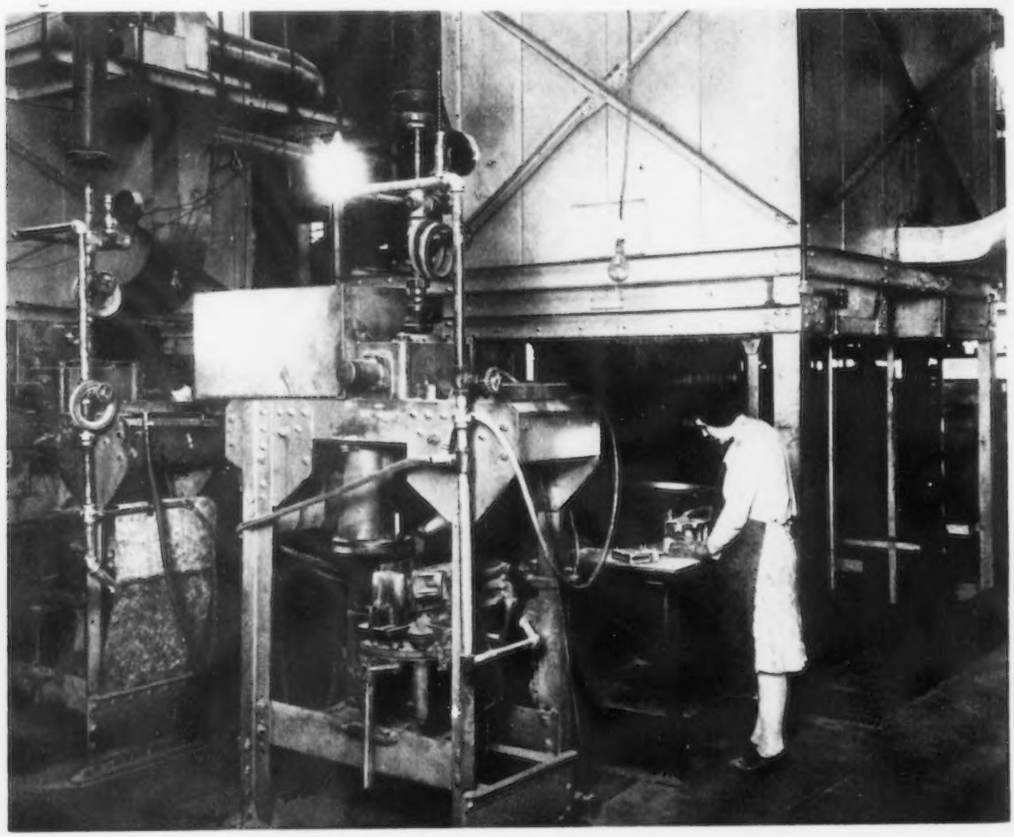
The furnace charge is made up from these bins and unloaded into the furnace by means of the overhead crane. The furnace is operated so that there is a 9-ton bath throughout the working day. Should it be necessary in the future, the bottom of the furnace can be lowered to provide an 11-ton bath. Furnace operation is continuous, with 3½ tons of iron tapped per hour. The temperature of the metal





MOLDS are poured as they pass on a continuous conveyor (at left).

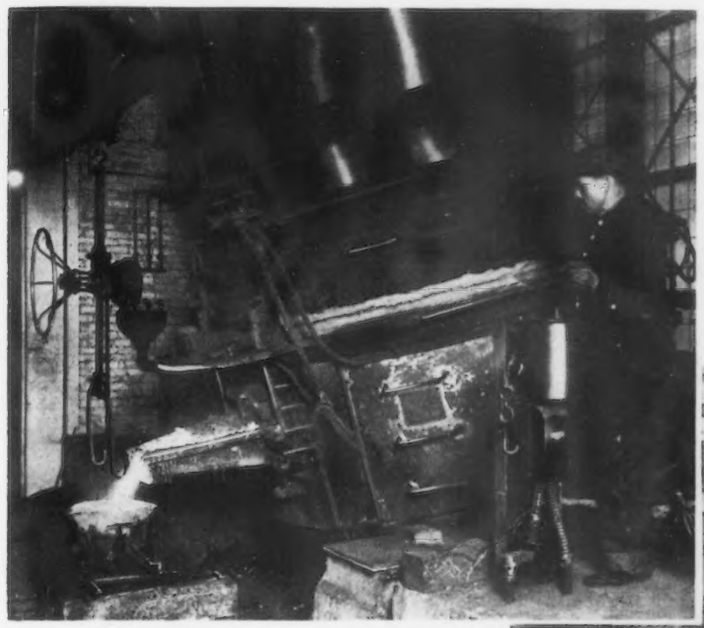
CORE-MAKING machines and benches are placed around the core ovens, two of which are of the vertical conveyor type.



at the spout is 2650 deg. Fahr. Every three-quarters of an hour a sample of the iron is taken at the furnace spout and careful chemical analyses and physical tests are made.

Hot Metal Handled by Monorail

Extending from the furnace spout and branching two ways to each of the continuous mold conveyors is an overhead monorail system, made by the Modern Pouring Device Co., Port Washington, Wis. The ladle is filled at the furnace and is pushed along by hand about 30 ft. to one or the other of the pouring zones at the continuous conveyors. The metal is poured into several of the molds and while others are moving into place the ladle is returned to the furnace, refilled and again brought back to a pouring station.



THIS electric furnace, in which the iron is melted, is operated steadily throughout the 9-hr. working day (above).

MOLTEN pig iron is conveyed from the furnace to pouring stations by means of a monorail system.

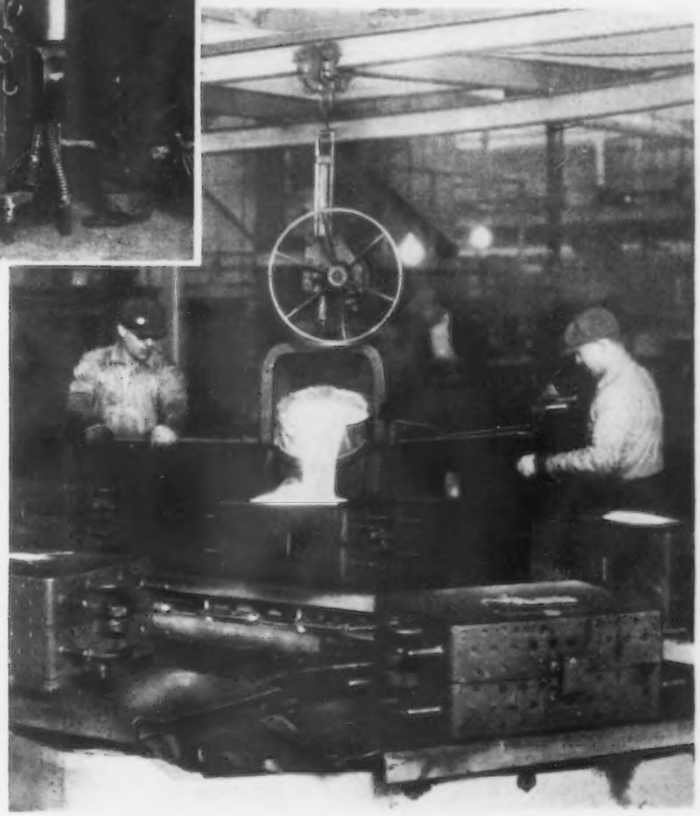
The poured mold moves along on the conveyor to the shakeout, where it is pulled off the conveyor on to a vibrating screen where the sand is shaken from the castings through a screen plate. The castings are taken from the screen and placed in trucks for removal of gates and risers and rough cleaning.

Annealing Done in Electric Furnace

Castings are then moved across the aisle and stored in barrels preparatory to being annealed in a unit supplied by the Electric Furnace Co., Salem, Ohio. This furnace is equipped with a hydraulic pusher. The trays of castings go down one side and after being pushed across the furnace return on the opposite side to the loading end of the furnace. The complete cycle requires approximately 5 hr., the castings remaining in the heating zone for 12 min. The temperature in that zone is 1500 deg. Fahr., control being by means of Leeds & Northrup Co., Philadelphia, pyrometer equipment.

The castings, after having passed through the annealing furnace, are dumped into barrels preparatory to tumbling and sand blasting operations. Sand blast equipment consists of direct pressure units made by the Mott Sand Blast Mfg. Co., Chicago.

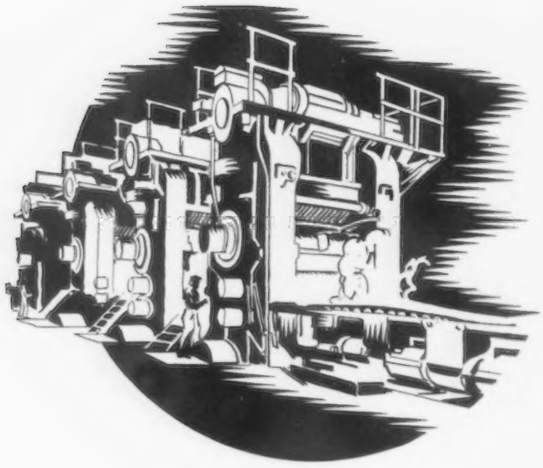
After the castings have been cleaned they are thoroughly inspected for cracks and other defects and then given a hydraulic pressure test after which they are again inspected. After machining and grinding operations they are again given a hydraulic test and then Parkerized and finally given a coat of black lacquer.



It is interesting to note that, with this sand and mold handling equipment, ten men do the work formerly performed by 30 men. They produce 800 complete molds in a 9-hr. day, producing 3200 castings which range in weight from 2¼ lb. to 9 lb. each.

WHAT BUYERS SHOULD KNOW ABOUT SHEET STEEL

By HAROLD W. SCHROEDER
Wheeling Steel Corpn.



▲ ▲ ▲

BECAUSE of the many uses to which sheet steel is now being put and the various finishes in which it is being produced, the buyer should in most circumstances explain to the steel mill the purpose for which the material is required. Whether the sheets are for a specific operation or for a multiplicity of operations on many different parts, the more information that is given to the sheet mill the greater will be the customer's satisfaction as to quality and cost.

It might happen, for example, that the mill would be able to suggest a quality of sheet that would answer the purchaser's requirements at a lower cost than the grade of sheet originally considered. In some instances when a buyer orders sheets without fully acquainting the mill of the purpose for which the material is to be used, it is found that another grade would have better met the requirements.

Specific information on each grade of sheet steel might in many instances be misleading, but for purposes of general information, particularly in view of the technical and mechanical developments of the past few years, the author has endeavored to treat the various methods of sheet production and the general results in the finished products.

▼ ▼ ▼

IN this day and age countless articles are made and used which employ sheet steel either wholly or in part in their construction. Many indeed are the factors which must be met by suitable types of steel, and, likewise, varied finishes require appropriate surface on the sheet steel itself in order to permit ever more attractive appearance in the finished product.

Years ago, when sheets were produced only in stock sizes and gages by the steel mills and carried in jobbers' warehouses throughout the country, black and galvanized sheet iron was sufficient for the needs of industry. Since that time the constantly increasing, diversified, specialized requirements of the manufacturer have brought out an almost equal number of special grades of sheet steel to meet the specific demands of each user.

There has been a decided trend toward the substitution of steel stampings for other materials. Such stampings demand a tough, ductile sheet metal of deep or extra deep-drawing quality, produced by using steel of suitable analysis from the open-hearth furnace, and giving it its proper heat treatment to produce or preserve the grain structure necessary for the physical characteristics required. Analysis and heat treatment are inseparably connected. The finest chemistry of steel making can be canceled by improper annealing, while, in turn, no annealing can make a silk purse out of a sow's ear.

Many articles formerly made from wood are now fabricated from sheet steel. Working qualities are usually confined to right angle bending, while the emphasis rests upon flatness and high surface finish to support the lacquers or enamels employed. Steel furniture and steel partitions are characteristic examples of this class.

Still other uses combine the deep drawing requirement of sheet steel stamping with the highest of surface finishes. The modern automobile body is typical of this class.

In between lie a host of intermediate demands upon the skill of the steel manufacturer, and the answer is always the same. Within commercial limits, the steel maker can supply whatever the customer wants and is willing to pay for. It is the last proviso that makes all the trouble, since the purchaser almost invariably wants a grade of sheet steel satisfactory for his particular work at the price

SHEET STEEL CLASSIFICATIONS AS TO

Trade Name	Type of Mill	Treatment	Size and Gage
CLASS I: Hot-Rolled Continuous Mill Sheets	Continuous Hot Mill	Ingots, bloomed and cleaned, or slabs heated and cleaned, given one continuous hot pass through multi-stand mill, coiled and cooled for soft temper, or cooled on flat bed, sheared or shipped in coils. (Note—Can be box annealed or normalized where necessary for special purposes.)	⅜ in. to No. 16 ga. over 24 in. wide up to 54 in. to 42 in. wide depending on gage. Lengths from 72 in. to 300 ft. or over.
Hot-Rolled Continuous Mill Sheets, Pickled	Continuous Hot Mill	Ditto, except only coil-cooled stock, continuously pickled and dried or oiled, sheared to length.	Ditto
CLASS II: Light Plates, Blue Annealed	3-High Jobbing Mill	Blooming mill slabs, hot-rolled, open furnace annealed.	⅜ in. to No. 12 ga. up to 72 in. wide, and up to 240 in. long.
Blue Annealed Sheets	2-High Jobbing Mill	Sheet bars, hot-rolled, open furnace annealed.	No. 13 to No. 16 ga. up to 66 in. wide and up to 210 in. long.
CLASS III: One Pass Cold-Rolled Box Annealed Sheets. (OPCR Sheets) (Black Sheets)	Hot Sheet Mills	Sheet bars, hot tight rolled, 2 to 8 sheets per pack depending upon gage, cooled, opened, flattening cold roll pass, box annealed.	No. 10 to No. 30 ga. up to 54 in. to 36 in. wide depending on gage.
Hot-Rolled Pickled and Annealed	Hot Sheet Mills	Ditto, except pickled and dried, or oiled or limed.	Ditto
Single Pickled Full Cold-Rolled Re-Annealed	Hot Sheet Mills	Sheet bars hot tight rolled, opened, cold rolled, annealed, pickled, two or three pass cold rolled on bright mills, reannealed.	No. 14 to No. 28 ga., 54 in. to 36 in. wide depending on gage.
Full Pickled Full Cold-Rolled, Re-Annealed	Hot Sheet Mills	Using pickled sheet bars, otherwise processed in same manner as SPFCR.	Ditto
CLASS IV: Steel Furniture Sheets	Hot Sheet Mills	Pickled sheet bars, hot loose rolled, sheets separated after each pass, "breakdowns" pickled at an intermediate point during rolling, annealed, pickled, full cold rolled, reannealed, stretcher-leveled. Deoxidized if specified.	No. 12 to No. 24 ga. up to 48 in. wide.
Auto Body Sheets	Hot Sheet Mills	Hot loose-rolled etc., same as No. 1 Furniture, but subsequent cold mill work and heat treatment are designed to fit each type of sheet for the specific purpose for which it is to be used. General classifications are as follows: 1. Deep-drawing dull finish autobody: box anneal, pickle, one or two cold passes in water mills, anneal wet, finish with one dull pass to give sufficient temper to avoid stretching strains upon being worked by buyer. 2. Extra deep-drawing dull finish autobody: Normalize for fine grain structure, pickle, one or two cold passes in water mills, scrubbed and dried, low temperature box annealed, and deoxidized, if so ordered, one dull finishing pass to avoid strains. 3. Hood and fender stock: Box anneal, pickle, two cold passes on bright mill, low temperature box anneal, two or three cold bright mill passes depending on temper desired.	No. 18 to No. 22 ga. up to 48 in. or wider.
CLASS V: Cold-Rolled Continuous Mill Sheets	Continuous Cold Mills	Coiled hot mill bands, pickled, cold-rolled, annealed, finished, sheared and shipped, usually oiled for protection from rusting.	No. 14 to No. 28 ga., over 24 in. wide up to 48 in. to 36 in. wide depending on gage.

NOTE—All sizes and gage limits given are subject to modification in exceptional

D ROLLING, TREATMENT AND USES

Description	Uses
Similar in appearance to blue annealed, except has rolled instead of sheared edge. Camber, out-of-square, width, length, and gage tolerances same as blue annealed. For stamping or forming work, some cross breaks will occur when coil-cooled material is furnished; flat bed-cooled stock will be stiffer and free from cross breaks. Sold on hot-rolled continuous sheet base, and blue annealed extras.	For all ordinary work, too numerous to mention, where smooth surface is not essential for subsequent finishing, and presence of hot-rolled scale is not a drawback. Owing to nature of manufacturing process, orders are only accepted for certain minimum quantities of each item of gage or size. This is the cheapest available flat-rolled sheet steel in this gage and size range.
Same as hot-rolled except cleanly pickled, free from open seams, blisters or lamination. Open pickled surface, not cold rolled. Sold on hot-rolled base and extras, plus 25c. for pickling and plus 10c. if oiled or limed.	For drawing or stamping work of all sorts, where scale free surface would be desirable but smoothness or high finished surface is not essential.
Commercially flat, reddish-blue to full blue oxide covered, scale fairly heavy and not very tightly adhering, sold on blue annealed base and extras. (Note: Must be pickled if stock is to be formed or drawn under dies. Pickling and oiling 25c. and 10c. extra respectively.)	For all ordinary work, similar to hot-rolled and pickled hot-rolled continuous sheets, except that jobbing mills as their name indicates, are adapted to production of any quantity of an item without minimum limit, and further, are capable of rolling much wider widths than are yet produced on continuous mills.
Same as light plates, blue annealed, except slightly better surface due to production from sheet bars instead of blooming mill slabs, and to initial reduction on roughing rolls with finishing on separate stand of finishing rolls. Sold on blue annealed base and extras.	(Same as light plates, blue annealed.)
Fairly smooth, uniformly soft for easy working. Should stand double seaming and slight forming. "Picture frame" tight black annealing oxide around edges, commercially flat, and free from loose oxide. Sold on OPCR base and extras.	Miscellaneous commercial uses requiring a common black sheet. Superior in No. 10 to No. 16 gages to blue annealed of the same gages, from the standpoint of smoothness of surface and freedom from loose heavy scale. This is the cheapest black sheet available in gages from No. 17 to No. 30, in sheet mill sizes.
Cleanly pickled steel, free from deep pitmarks or objectionable open surface, open seams, blisters, or lamination, commercially flat, inspected for pattern sheet and shipped with good side up. Sold on OPCR base and extras plus extras for pickling depending upon gage.	Any manufacturing requirement where a clean, reasonably good surface is necessary, free from scale. Dead soft unless given additional cold rolling for temper, and very susceptible to rust unless protected by liming or oiling. Principally used for unexposed parts of automobile body or furniture work, or other uses where the metal will be protected by paint or lacquer without high finish requirements.
Smooth full cold-rolled finish, "picture frame" thin tight oxide, surface clean, free from scale, open seams or blisters. Will include occasional pitmarks or bar scale open surface, but not to an objectionable extent. Inspected for pattern sheet and shipped good side up. OPCR base and extras.	Suitable for moderate drawing, and for right angle bending or forming, in the manufacture of filing cabinets, steel furniture parts in less exposed positions, boxes, bathroom cabinets, etc. This is the first of the higher grade sheets, and is used for countless purposes where standard of finish is good, but not sufficiently exacting to require No. 1 steel furniture or auto-body stock. It has replaced the former No. 2 furniture sheet, now obsolete.
Same as SPFCR except practically no pitmarks or open surface, and freer from other surface imperfections than SPFCR sheets. Inspected for pattern sheet and shipped with the good side up. OPCR base and extras.	An intermediate grade between SPFCR and No. 1 steel furniture. By pickling the sheet bar before hot rolling a decided reduction is effected in the bar scale open surface on the finished sheet, which would remain visible even after full cold rolling. Often used where high standard of finish is desired, but extreme flatness of No. 1 furniture stock (due to stretcher leveling in that grade) is not necessary.
Tight, smooth, highly finished surface; free from pits, cold roll marks, open seams, or other surface defects. Flat. Unless ordered resquared, sheet furnished will include ordered size between gripper marks. Allowance for shearing off gripper marks and for side shearing always made unless otherwise ordered. Inspected and shipped good side up. Sold on No. 1 steel furniture base and extras.	Used for high-grade metal furniture, radiator covers, lacquered refrigerator cabinets, door or partition panels, etc. Suitable for ordinary bending and light forming. Supplied in either regular dark finish, or in white finish if so specified, without extra charge. However, like all deoxidized or white pickled sheets, white finished material should be protected by oiling or liming, to guard against atmospheric rusting during transit from the mill and while awaiting fabrication at the purchaser's plant. Since the gripper ends constitute about two in. extra at each end of the sheet, it is often cheaper to order the sheets resquared at the mill and pay the regular extra of 5 per cent, rather than pay freight on the scrap and pay for the scrap itself, amounting to about 5 per cent of the weight of the sheet. Manufacturers of steel furniture usually employ SPFCR on the more hidden parts, but use No. 1 furniture sheets on the conspicuously exposed portions. There is an increasing tendency to gain structural rigidity through the use of more deeply formed sections, thus permitting a reduction in the gage of sheet steel used and thereby lowering the cost.
High-grade, pickled cold-rolled sheets, either dull or bright finish, depending upon the purpose intended. Variations between classifications are as follows, all sold on an autobody base:	
Dull smooth surface, fairly tight, free from surface defects. Can be supplied also in extra deep drawing, maintaining high standard of finish and also meet difficult stamping requirements. Effect of final cold dull finishing pass will be dissipated in time if held in storage, and such material must be reconditioned by roller leveling by the purchaser prior to using.	1. Deep drawing auto body sheets are used for parts requiring shallow draws such as lower backs of car bodies and by some makers for the lower sections of the doors.
	2. These sheets are used mostly for rear quarter panels or wheel housings, upper backs, radiator dust shields, one-piece fenders, doors and windows and other parts requiring severe draws. Due to its fine grain structure from normalizing, the sheet after drawing has a smooth surface and shows no "orange peel" effect or rough surface after drawing. Under present designs, this sheet has shared with cold-rolled strip in superseding the old crown fender stock.
Very tight smooth polished surface, free from pits, cold roll marks, scale, or surface defects which would show through high grade japanning. Stiff and flat.	3. These sheets have a much better finish than any grade of autobody, and are used for flat work or slight bends, such as hood tops and sides, fenders of light draw, running boards, splash boards and fender aprons, door and side panels, etc.
Similar to cold-rolled strip steel in appearance and characteristics, available in the equivalent of SPFCR, FPFCR No. 1 M.F., and autobody grades, sold at base and extras applicable to grades named.	Suitable for use for each equivalent grade of Classes III and IV, provided minimum tonnage of each gage and size will satisfy the manufacturing requirements of this type of operating unit. Silky grain structure resulting from extremely heavy cold working proves admirably adapted for severe drawing operations without opening or roughening of highly polished surface. Also, like cold-rolled strip steel, these sheets can be rolled to form better on a break than hot mill sheets, or formed into parts which have a complicated bend, such as a jamb on a safe door.

ional cases by certain mills equipped to furnish material beyond usual standards

of a sheet of a lower grade. In the case of the exception, the purchaser uses a sheet which is very satisfactory but perhaps unnecessarily expensive.

Sheet Mills Able to Suggest Best Product for Each Purpose

Lest the buyer attempt to depend entirely upon his own knowledge, usually gained outside the steel industry, rather than avail himself of the stores of accumulated experience possessed by the steel mills, he is urged to submit his requirement to the mills for their diagnosis and prescription. The more fully he does this the greater will be his satisfaction both as to quality and as to cost. The mill working under this plan will be responsible for the satisfactory performance of the grade it has suggested, and at the same time in order to be protected against present or eventual competition it will endeavor and often will be able to suggest a quality of sheet that would answer the customer's requirements at a lower cost than the grade of sheet originally considered. In other words, when the buyer needs professional advice, he should not try to prescribe for himself but should call in the steel mill doctors, and give them credit for knowing the subject that is their life work.

In order that the purchaser may have a working idea of what they will discuss with him, we classify the five main divisions of sheet steel as it is produced in this country today. Each of these divisions is capable of almost unlimited variation in the possible combination of analysis, heat treatment and surface processing. Nevertheless, they are easily classified by their source or initial handling, as follows:

I. The continuous hot mill producing the modern equivalent of the product of

II. The jobbing mill, either using slabs on a three-high small plate mill, or sheet bars on a two-high two-stand mill.

Note: Each can supply only a characteristic hot-rolled finish, subject to the alternative of pickling to remove the loose scale. These two classes are the cheapest forms of sheet steel.

III. Hot sheet mills, distinguished by their practice of producing "tight-rolled" packs which are hot rolled, and opened when finished and cool, from

IV. Hot sheet mills employing the system known as "loose-rolling," where the surface of each sheet throughout its production can be cared for, pickled clean, kept clean, and kept separate from its companion sheet or sheets in the loose pack.

Note: All common grades of hot mill sheets are produced under tight-rolled practice, and it is not until the finest surfaces are required that the hot mills are set up for the more expensive loose-rolling and obliged to give each sheet separate and preferential treatment. The hot mill produces high-finish sheets with difficulty owing to its inherent obstacles in keeping the sheet bar, breakdown or pack free from oxide, scale, or mill cinder during rolling and the numerous necessary reheatings in process. After many years in narrow cold-rolled strip sizes, continuous mill rolling has been developed into

V. Continuous cold mill rolling in sheet widths where the cleaned slab or bloomed ingot, after being rolled into a coiled band in one continuous hot pass on the continuous hot mill, is continuously pickled and then reduced in one cold pass to the ordered gage.

Note: Manufacturers using this process claim that possible imperfections in the finished sheet are eliminated by the same standards of inspection that are applied to equivalent grades of hot sheet mill products (Classes III and IV), while the basic surface finish and working qualities of the sheet are superior to the product of the hot sheet mill.

All Classes of Sheets Can Be Produced in Any Analysis

With these divisions in mind, the reader will be prepared to study the tabulated analysis on the accompanying insert, showing the principal grades of material produced within each classification. Bear in mind that all classes can be produced from steel of any analysis desired. Classes I and II permit little variation of surface or heat treatment, but with these exceptions, any degree of heat treatment can be given. In Class III, grades of single pickled or better can be produced in a variety of tempers within the same finish to suit the particular requirements of the job. The same is true of Class IV. Class V possesses the greatest latitude, since it can combine any degree of analysis, heat treatment or temper up to full hard (Rockwell readings of 90 or better).

Heat treatment is usually controlled by the rate of cooling on Class I, is accomplished by open or blue annealing on Class II, and is usually in the form of box annealing on Classes, III, IV and V. However, normalizing is being employed increasingly in these classes in order to produce the fine grain structures within the steel that are required for satisfactory working under certain conditions. Class V is claimed to be so silky in fiber that its grain structure can be considered as negligible; forming with or across the grain makes little apparent difference and deep-drawing operations do not result in the open surface "orange peel" effect that is only minimized by normalizing on hot sheet mill products.

Surface variations range most widely in Class III. Cold passes through bright or dull (wet) rolls, pickling, and deoxidizing anneals, are the three most important variables. Beginning with common or OPCR sheets, three cold bright passes produce a common japanning stock bearing a thin tight oxide and fairly smooth surface suitable for black japanned sides and backs of stoves, or for sheet steel shelving, lockers, etc. For work where any oxide is objectionable, due either to higher standards of finish or to the need of eliminating scale or oxide in order to avoid excessive wear of forming or perforating dies, the sheet would be pickled before the cold roll passes.

Hot-rolled sheets, pickled after annealing, are dead soft, scale-free and possess an open, relatively porous surface which forms easily under dies and provides an excellent bond for lacquers, paints or enamels of good covering power. Similar processing is employed on so-called pickled and annealed stock as produced on tin mills and usually employed in the production of vitreous enameled kitchen utensils. This must not be confused with the sheet mill vitreous enameling grade, which is produced in a heavier range of gages and used principally for flat or slightly formed work such as table tops, gas stove parts,

electric refrigerator parts and panels, signs, etc. The important factors of this vitreous enameling stock are that it shall have been produced from iron or steel of proper analysis, the ingot having been heavily cropped to insure sound homogeneous metal, and the sheet kept truly flat throughout its rolling to avoid internal stresses which would have been caused by subsequent flattening processes, and would result in warpage in the furnace when subsequently fired. Beyond these are various technical considerations, such as freedom from occluded gases, etc., which complete the difference between a high-priced vitreous enameling sheet that is sure to enamel successfully if properly handled and a common pickled sheet that may or may not come out of the furnace afflicted with the smallpox.

Surface Finishes Improved by Passes Through Cold Rolls

If we take a hot-rolled annealed and pickled sheet we can improve its surface finish by one, two or three passes through the cold rolls, increasing its temper as we do so and thereby increasingly limiting its use to flat work. To avoid this, reannealing will restore soft and ductile working qualities, retaining the good surface finish produced by the previous cold rolling, but darkening the sheet by the formation of an extremely thin tight blue black oxide, dark at the edges where the oxygen in the air in the annealing box could reach it, and lightening to a straw color sometimes at the center of the sheet. If this is objectionable for any reason, introduction of gas into the annealing box during cooling will serve to reduce this oxide and produce a silvery white oxide-free surface. These two latter sheets are the commercial "single pickled, full cold-rolled reannealed," either usual dark finish, or special white finish. Single pickled sheets are probably more widely used than any other intermediate grade of special finish sheets, since they are adapted for a host of purposes up to the point where more exacting standards of surface inspection are encountered.

Sheet Bar Pickled for Extra Surface Finish

Pickling the sheet bar prior to hot rolling gives the next advance in quality of surface finish, and is as far as the sheet maker can go in eliminating surface imperfections on tight-rolled practice.

So far, cold rolling has been on bright mills, tending toward smoother and more polished surfaces. However, on loose-rolled sheets, both types of cold rolling are employed. Furniture sheets are usually bright cold rolled, as is also the case with hood and fender stock for automobiles. Deep and extra deep-drawing autobody sheets, however, are usually produced with dull finishes from cold passes through wet mills, this surface being preferable to avoid excessive pressure on hold downs necessary to prevent slippage if polished sheets were used.

One finish not yet mentioned is the even color blue produced by the introduction of steam into the annealing box in much the same manner as the gas discussed in connection with deoxidized finish. From common blued sheets used for ordinary stove pipe successively higher grades are produced up to a full pickled full cold-rolled range steel blue, while several very high-grade specialties are available to take the place of the Russia iron of many years ago. Material of this sort is refined and worked together with its protecting coat of tight oxide until it resists atmospheric rusting, and as such is used for range hoods and covers, etc.

Coated Sheets Come in Several Different Forms

All of the preceding are uncoated. Of the common forms of coated sheets there may be mentioned in passing, the following:

1. Commercial galvanized for ordinary work.
2. Tight-coat galvanized for forming work.
3. Dull-coat galvanized for oven linings, etc.
4. Special heavy zinc coatings for special roofings.
5. Long terne sheets for fabricating or forming.

It is truly said that a little knowledge is a dangerous thing—to repeat, the buyer should place his requirements before the steel mills, give them all the information necessary and then put it up to them to supply the proper grade for the work, regardless of what name he or they may give it. Grades and names vary between makers; so it is not safe to go by name alone in securing material from a new source of supply.

Open or Gondola Cars Superseding Box Cars for Shipping

Very much the same remarks apply to the matter of car loading and bracing on sheet mill products. Where crane facilities for unloading are available, box car loading with its expensive hand labor is being superseded in many cases by open or gondola car loading, with material on skids banded into units by Acme or Unilastic method, or similar, and protected by well secured waterproof paper shrouds or covers.

If the buyer specifies the manner of loading, he must assume the responsibility of safe arrival provided his instructions have been complied with. Also, if the purchaser should specify methods of loading or bracing which materially increase the loading cost of the producer, the matter of additional charge becomes a matter of negotiation.

Mills Will Accept Shipping Responsibility

On the other hand, if the purchaser names the type of car desired and leaves the rest to the manufacturer, it then becomes the manufacturer's responsibility. The mill, with its vast experience in car loading, and acting in conjunction with the railroads, is in a position to know and use the methods which have been adopted and used by the sheet steel industry and which have been approved by the railroads.

If, in spite of all precautions, a car should arrive in bad order, it is the duty of the consignee to notify the delivering carrier immediately to inspect the car before it is unloaded. Also, at this same time the mill should be notified so that likewise it may inspect, and, if necessary, modify the method of succeeding car loadings to cope more successfully with the particular conditions encountered.

TAPPING THE BLAST FURNACE

FEW manufacturing processes present such spectacular opportunities for artistic photography as the production of iron and steel. Appreciating this fact, the Colorado Fuel & Iron Co. brought Eugene Hutchinson, a Chicago photographer, to its plant at Pueblo, Colo., to make photographic studies of various operations. A number of these will be reproduced in THE IRON AGE. One of Mr. Hutchinson's most striking pictures is this one of the tapping of a blast furnace.

METAL FINDS NEW USE IN TERRESTRIAL GLOBES

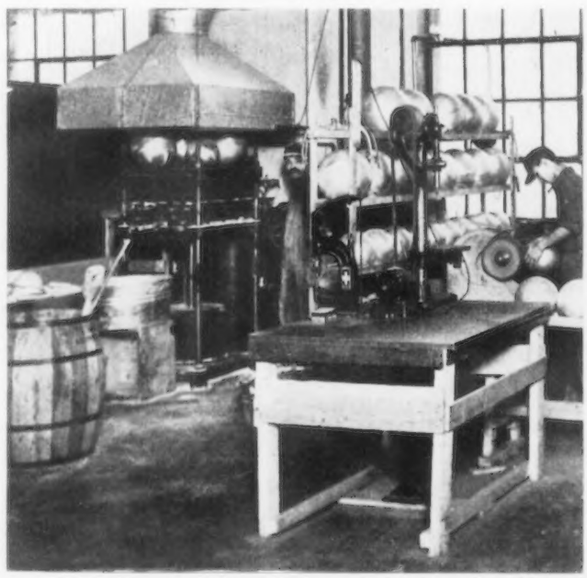
(Above) Applying a paper map of the world in 12 sections to an aluminum globe 12-in. in diameter. The map is then sized and coated with varnish. (Below) Grinding completed globes to remove imperfections, which may appear after locking the two hemispheres together. (Right) Drawing No. 16 gage aluminum blanks into hemispheres for terrestrial globes. These blanks are furnished in the required sizes by the Aluminum Co. of America, so that the maker has no waste.

METAL has invaded a new field, new in the use of metal, but old as a field of manufacture. Terrestrial globes have been used for practical and ornamental purposes for centuries, but it is only within the past year that metal has been adopted for their manufacture. For generations, globes have been constructed of compositions, usually a fiber base coated with plaster, to which a map of the world was applied and shellacked or varnished for protection.

About a year ago C. S. Hammond & Co. began experiments at their plant in Brooklyn with metal for globes, and after testing plain and alloy steel sheets and non-ferrous metal, decided upon the use of pure aluminum as the most suitable material for the purpose. Drawn and spun from No. 16 gage aluminum disks, the globes provide a substantial and smooth foundation for the application of terrestrial maps.

While various sizes of globes are made for use in schools, scientific institutions and for decorative purposes, the aluminum globes have so far been used only in the two most widely used sizes, 9 in. and 12 in. in diameter. In the smaller diameters, the globes are constructed of wood flour and resin, baked in molds and cemented together. An additional use of metal in the Hammond company globes is in the bases, which are largely iron castings, finished in various hued lacquers or antique bronze, although wood pedestals are used also.

In forming the hemispheres of the globes, two



BROADENING interest in international affairs and events is bringing increased demand for globes bearing maps of the world for use in schools, scientific institutions and for decorative and utilitarian objects in homes and offices.

While globes have been made since the seventeenth century in England, France, Spain, Italy, Germany and later in the United States, some constructed and finished by master craftsmen, only recently has metal been used for the material of manufacture.

C. S. Hammond & Co., which selected aluminum sheets of No. 16 gage as most suitable for the purpose, tried other metals before making a decision. The accompanying article and illustrations tell the story of one more field of manufacture into which metal is entering.

draws of the aluminum circular blanks are required, at which time a hole is punched in the center to carry the axis, a brass tube. The half-sections are then spun, making the product so uniform that the two halves may be matched with the abutting edges, leaving a smooth and even surface, which only occasionally needs grinding to give the requisite smoothness for application of the map.

To assemble the globes, a sheet steel disk with a flanged edge and a hole in the center is inserted into one hemisphere, with the flange of the disk projecting as a support for the other half of the globe. A length of light brass tubing, slightly longer than the diameter of the globe, is then inserted through the holes in the hemispheres and the projecting ends are upset, locking the two halves into a complete globe. Placed in a rack, the globe is now ready for application of 12 orange-peel sections of the world map, after which it is sprayed with varnish for protection and mounted on its cast iron or wooden pedestal.

Metal Offers Certain Advantages

The metal globe appeals to the manufacturer and retailer as offering certain advantages. It gives uniformity of product, which is essential in applying the maps and suffers practically no waste from damage in handling before the maps are applied, or during completion of manufacture. Should a globe become damaged by denting in shipment, or through an accident on the retailer's shelves, the manufacturer can

SPINNING half of an aluminum globe. This operation provides smooth uniform sections, the edges of which meet with but minor variation, removed by a final grinding after mating the two half sections.

UPSETTING the ends of the light brass tube which forms the axis of a globe and locks the two hemispheres firmly together.

remove the applied paper map, separate the two halves and remove the dent by respinning. As each globe represents 50c. to 60c. worth of aluminum, the repair of a damaged piece is worth undertaking.

Pressed Steel Globes Tried

Before selecting aluminum as most suitable for the manufacture of globes, the Hammond company tested various qualities of steel, including corrosion-resistant sheets and rustless steel. While the rustless steel provided a satisfactory globe in every respect, it increased the cost of the finished product. Ordinary and corrosion-resistant sheets provided satisfactory globes of uniform size, but were subject to rust from the liquid cement used in applying the paper map sections. In an effort to obviate this, the steel globes were coated with shellac before applying the map, but the coating was broken by the sharp knives used by the operators, who apply the map sections, in trimming the edges immediately after cementing each section to the surface.

While the Hammond output of metal globes is limited to the 9-in. and 12-in. spheres at present, the company is considering making large decorative globes of metal, which provides lightness, uniformity of product and long life.

Bright Annealing of Steels in Hydrogen

At the February convention of the American Institute of Mining and Metallurgical Engineers, Floyd C. Kelley, General Electric Co., presented a paper on "Bright Annealing of Steels in Hydrogen," dealing with causes of oxidation of stainless iron and low-carbon steel in hydrogen furnaces and methods of preventing it.

The fundamental knowledge obtained from a series of experiments which are described is applied to the continuous annealing of these materials. The chief causes of oxidation are water vapor held by the furnace insulation, moisture condensed in the cooling chamber, and air which diffuses into the furnace against the pressure of the hydrogen.

Low-carbon steel has a critical temperature range of oxidation, which does not favor slow cooling from the annealing temperature if bright material is desired. Stainless iron undergoes selective oxidation in a furnace of the same type, and this oxide is not easily reduced. The author concluded by describing two different furnace designs for the continuous annealing of these materials. One is used for low-carbon steel, and the other for stainless iron (rustless steel).

Design of Open-Hearth Ports

(*Concluded from page* 1257)

waste products in the port ends at 1100 deg. C. (1373 deg. C. absolute) and 1600 deg. (1873 deg. absolute) respectively, the volumes will be:

$$V_{gas} = \frac{1 \times 1373}{273} = 5 \text{ cubic meters (175 cu. ft.)}$$

$$V_{smoke} = \frac{0.8 \times 1873}{273} = 5.5 \text{ cubic meters (195 cu. ft.)}$$

The calculated relationship answers satisfactorily to that of the corresponding velocities of gas and smoke, respectively

$$\frac{S_{gas}}{S_{smoke}} = \frac{30}{33} = \frac{5}{5.5} = 0.91$$

Now it is evident that, having in the gas port a velocity of 30 m. (98 ft.) a second, we must on the other side of the furnace have a draft, strong enough to create a velocity of waste gases in the port at 33 m. (108 ft.) a second. The coincidence of the velocities mentioned in our example is an exception. In any case the relation between the velocities of gas and smoke in gas ports of common open-hearth furnaces is mostly about one to one.

Tall Stacks Are Found Necessary

These calculations explain the necessity of comparatively high chimneys, in spite of many objections against them. The gas stream having a velocity of about 30 m. a second is moving much faster than the air stream, the latter having usually one-half of the above value. (See: Stewart Cort, "Comparison of Open-Hearth Furnaces of Various Sizes." American Iron and Steel Institute, May, 1926).

This means that the direction of the flame will correspond to the direction of the gas stream. That is the reason why the direction of the air stream is less important. The inclination of the air ports is usually twice as great as that of the gas ports, having an angle of between 30 and 40 deg.

Better Mixing of Gas and Air

As to the question of better mixing of gas and air, it is not fully applicable to our case. As mentioned above, the flame of ordinary open-hearth furnaces is nothing else than a thin burning envelope of a comparatively cold gas stream.

The experienced designer of furnaces, therefore, will always take care of a good and possibly complete contact of this envelope with the metal bath. It is very difficult to change, in the ordinary furnace, the type of the flame, but it is being done by special ports in some new designs.

The maximum air velocity in the port ends is limited by the low draft effect of the chambers, while this velocity in the gas ports is assisted by the gas pressure in the piping.

Accordingly, the velocity of the air stream usually does not exceed 15 meters (49 ft.) a second. It can be greater only in furnaces having deep and hot chambers, or when an air blast is used.

The following calculation may illustrate the condition mentioned. The height of a furnace of 30 to 40 tons capacity, between the floor of the regenerator chambers and the port ends, does not exceed (ordinarily) 9 meters (30 ft.), the chambers being about 7 meters (23 ft.) high. The temperature of the preheated air is 1200 deg. C. and that of the air entering into the chamber 400 deg. C. (The air is partly preheated on its way from the reversing valve.) Consequently the average temperature of the air will be about 800 deg. C., the draft induced by the chambers being as follows:

$$h_1 = \left(1.29 - \frac{1.29 \times 273}{1073}\right) \times 7 = 6.7 \text{ mm. of water}$$

and the draft induced by the ports:

$$h_2 = \left(1.29 - \frac{1.29 \times 273}{1473}\right) \times 2 = 2.1 \text{ mm. of water}$$

The total draft of 8.8 mm., as here calculated, must be diminished to approximately 3 mm. to account for the friction losses in the flues. The rest of this draft (5.8 mm.) gives a velocity as follows:

$$S = 0.7 \sqrt{\frac{19.6 \times 5.8 \times 1473}{1.29 \times 273}} = 15.3 \text{ meters (50 ft.) a second.}$$

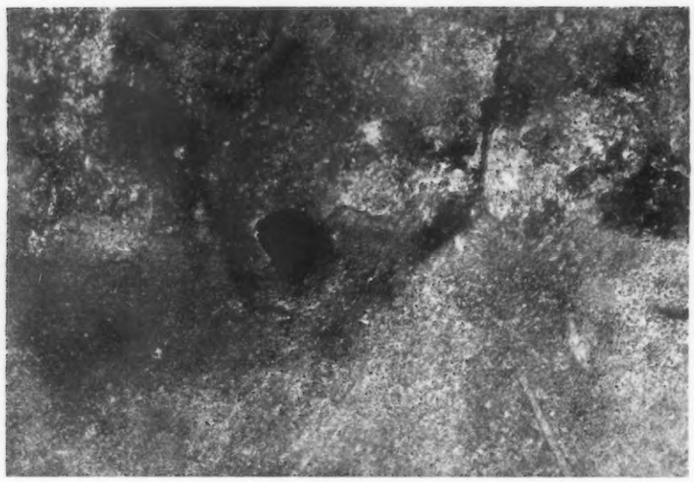
▲ ▲ ▲

Spray Coatings for Ingot Molds

USE of spray coatings for ingot molds as a means of improving steel ingot quality is discussed by F. Beitter (*Stahl und Eisen*, Dec. 11, 1930). The principle is to prevent the adhesion of oxide crusts to the walls of the molds in pouring for, if such crusts are embedded in the ingot, they produce blow holes, poor internal welds and inclusions.

Graphite and bitumen coatings are applicable for top-cast ingots; but these do not prevent the formation of oxide crusts on the surface of the metal in the slow pouring of bottom-cast ingots of large diameter. Coatings of powdered aluminum tend to prevent adhesion because of the heat evolved in reaction with the liquid steel. Substances which give off neutral or reducing gases will prevent the access of oxygen and also tend to reduce the heat loss to the mold. Best results were obtained with water-free tar and rapid-drying asphalt lacquer, especially when mixed with aluminum powder.

If the coating is too thick, a poor surface will result, owing to gas bubbles. The coking of tar coatings may also cause rough surfaces to which crusts adhere. For this reason the coating substances should be stable at 200 deg. F., so that charring will not result when they are applied to warm molds.



Final destruction of a large coke-fired pot.

HOW LONG GALVANIZING

"WHAT is the average life of hot galvanizing pots?" is a fair enough question for any hot galvanizer to ask. The answer, however, cannot be given offhand, as a detailed knowledge of all factors concerned requires that the question be much more specific. It is obvious that, where there are many branches to an industry, such as hot galvanizing, no one definite answer can be given to a general question.

The answer is further complicated by the fact that some companies measure the life of the pot in the number of days it has been in operation; other companies measure the life of the pot entirely from the actual number of pounds of production that have been put through the pot up to the time it failed. The most satisfactory answer, therefore, is to consider the question in more detail, and from practical results that have been obtained from pots in service.

In covering the question in a specific manner the first thing to do is to consider the subject from each individual branch, or field, of hot galvanizing. Like things are then compared, and the results obtained are from like practical operations. The logic of this method of attacking the problem can be seen, as it would be entirely unfair to compare the life of a sheet galvanizing pot, with the life of a pipe galvanizing pot, or a metal-ware galvanizing pot. Each one of these branches of the hot galvanizing industry is distinctly separate from all other fields, and the results in one field should not be compared, or discussed, at the same time, with results in another field.

Sheet Galvanizing Pots

First to be considered will therefore be the life of sheet galvanizing pots. The specific question which can be answered intelligently then becomes—"What is the average life of a sheet galvanizing pot?" This is very quickly answered in the summary which follows.

SHEET GALVANIZING POTS

Pot Number	Production Life	Time Life
1.	3,500 to 4,000 tons	4 to 6 Months
	Pots welded and turned	
	3,500 to 4,000 tons	4 to 6 Months
2.	14,000 tons average	
	19,000 tons high	8 to 12 Months
3.	18,000 tons average	9 to 14 Months
4.	18,000 tons average	9 to 14 Months
5.	11,000 tons average	6 to 9 Months
6.	6,000 tons average	5 to 8 Months
	9,600 tons high	
	3,200 tons low	

From this table a sheet galvanizing pot should be expected to give about 14,000 to 18,000 tons of production, and its time life should be about 8 to 14 months. In considering the above figures it is at once seen that pots 1 and 6 are far below the rest, and therefore something is radically wrong, either with the furnace design, or with the galvanizing practice.

One of these low figures is a gas-fired pot and the other is a coal-fired installation. The figures which give a high production are from three gas-fired installations and one coal-fired pot. The average sheet pot will do about 250 to 300 tons of production a week, which is at the rate of 3 to 5 tons an hour. This field of hot galvanizing is a surface area proposition, and only a very small weight of production enters the pot at one time.

Pipe Galvanizing Pots

The next question is "What is the average life of pipe galvanizing pots?" This question is also best answered by a few practical installations, the figures of which are shown below:

PIPE GALVANIZING POTS

Pot Number	Production Life	Time Life
1.	10,000 to 12,000 tons	5 to 6 Months
2.	14,000	4 to 6 Months
3.	20,000 to 35,000 tons	6 to 9 Months
4.	10,000 to 16,000 tons	6 to 8 Months
5.	20,000 to 30,000 tons	6 to 8 Months
6.	25,000 to 35,000 tons	18 to 24 Months

Here is another very interesting set of figures

DOES A HOT POT LAST?

By WALLACE G. IMHOFF
Consultant in Zinc Coating, Vineland, N. J.

Final destruction of a large gas-fired pot.

which need a little further explanation. All of these pots are gas-fired pots. Every one but No. 6 is averaging between 6 and 8 tons an hour production; No. 6 averages between 3 and 4 tons an hour. Three of these examples galvanize the pipe in large lifts at a time; the other three do them one or two at a time in quick succession.

These figures show that the average life for a pipe pot should be about 20,000 tons, and that it should last between six months and a year's time. The average hourly production is between 6 and 8 tons, a longer life being expected with a lower daily production. The daily production for two 10-hr. shifts should be about 120 to 160 tons, or about 2000 to 3000 tons a month, or possibly 3500 tons maximum. No. 6 seems to indicate that a lower hourly production, with one or two at a time practice, will give a much longer average pot life.

Pots for Structural Steel

Galvanizing pots for structural steel have an average life varying over a little wider range than the pots for sheets or pipes. This may be due to the fact that the production rate is perhaps not so high, and the tonnages galvanized at one time are not so large. The figures for a few typical installations are given below:

STRUCTURAL STEEL GALVANIZING POTS

Pot Number	Production Life	Time Life
1.	30,000 to 40,000 tons	18 to 24 Months
2.	3,000 to 5,000 tons	10 to 12 Months
3.	13,500 to 27,000 tons	18 to 36 Months
4.	15,000 tons	20 Months
6.	12,000 tons	10 to 12 Months
5.	15,000 to 18,000 tons	12 to 18 Months

These figures are extremely interesting when compared with those for pipe and sheet galvanizing pots. The average life for a structural steel galvanizing pot should be between 12 and 18 months. The production life should be between 15,000 and 30,000 tons. Daily production averages between 30 and 40 tons, or 3 to 4 tons an hour. The lower production rate is seen to increase the pot life in both time and tonnage, as compared with pipe galvanizing.

In the installations given were three pots burning natural gas, two oil, and one coke pot. The two with the shortest life were one oil-fired pot and one gas-fired pot. The two installations showing the longest life were one gas-fired pot and one coke-fired pot.

Pots for Outdoor Hardware

The next question is—"How long should a pole-line hardware pot last?" Some practical figures for this type of work are given in the table below:

POLE-LINE HARDWARE GALVANIZING POTS

Large Structural Work

Pot Number	Production Life	Time Life
1.	1,760 tons	2 Months
2.	9,186 tons	8 Months
3.	17,067 tons	14 Months
4.	2,345 tons	2 Months
5.	1,042 tons	1 Month
6.	1,596 tons	1 Month
7.	6,720 tons	7 Months
8.	18,000 to 21,000 tons	36 Months
9.	6,300 tons	9 Months
10.	15,000 tons	24 Months

POLE-LINE HARDWARE GALVANIZING POTS

Medium-Size Work

Pot Number	Production Life	Time Life
1.	7,000 tons	7 Months
2.	12,000 tons	12 Months
3.	9,000 tons	9 Months
4.		3 Days
5.	6,300 tons	8 to 9 Months

POLE-LINE HARDWARE GALVANIZING POTS

Small Work

Pot Number	Production Life	Time Life
1.	700 tons	5 Months
2.	585 tons	6 Months
3.	51 tons	½ Month

Here is a wide variation of figures from a number of different plans. For large structural work the pot life shows very wide differences of life.

One interesting fact is that all of these pots are heated with gas as fuel. The extreme variation in pot life seems to be due to high production, differences of furnace design and methods of combustion of the fuel. The pot having the longest life used gas fuel, at a low burning temperature, and a very moderate hourly production. The pots having the very short life used gas fuel, burned at a high temperature, and the production was high.

The medium-sized work was all done in gas-fired furnaces. For this type of work a pot life of about nine months is average, and a production life of about 9000 tons may be expected.

For very small work the pot temperature is usually higher, and both the time life and production life are correspondingly shorter. An average of 100 tons a month for six months is about the life to be expected for this class of work, although with careful supervision this life might perhaps be extended.

Galvanizing Range Boilers and Tanks

In considering the life of range boiler and tank pots it would be surmised that a fair life should be expected. A few typical examples show that the life of the pots for this class of material is very good with any type of fuel.

LIFE OF RANGE BOILER AND TANK POTS

Pot. No.	Production Life	Time Life
1.	Average 6,000 to 7,000 tons	11 to 22 Months
2.	Average 12,000 to 14,000 tons	36 Months
3.	Average 7,000 to 8,000 tons	24 Months
4.	Average 4,000 to 5,000 tons	12 to 18 Months

The examples cover three types of fuel—coke, oil and gas. The coke-fired pots in this field show the longest life in the installations given. The average life for this class of work would be about 18 months, with a tonnage life of perhaps 6000 to 8000 tons.

Electrical Conduit Galvanizing

The life of galvanizing pots for coating electrical conduit illustrates about what the life of a pot is, under maximum pressure of production, day and night. These pots are not large, yet for their size a remarkable production is put through them. The life as shown by average practice is given below:

ELECTRICAL CONDUIT GALVANIZING POT LIFE

Pot Number	Production Life	Time Life
1.	13,500 to 21,000 tons	9 to 14 Months
2.	12,000 to 19,500 tons	13 Months

For this class of work an average life would be somewhere around 15,000 tons of production, and a time life of from 10 to 12 months. Owing to the high production, it is not uncommon for these pots to fail much sooner. The average production is about 3 tons an hour, and the pots are generally run day and night, with an allowance for a short time for changing turns. Both the examples cited are pots fired with natural gas.

Galvanizing Wire in Pots

In wire galvanizing the pots are usually very much shallower than the average for the industry as a whole. The average pot for the industry is very close to 48 in. deep, some deeper and some shallower, while wire pots are only about 28 in. deep. A typical example, perhaps, of wire pots may be said to have a life of six months to a year. An installation of a wire pot is given below:

LIFE OF WIRE GALVANIZING POT

Pot Number	Production Life	Time Life
1.	15,000 tons	6 to 12 Months

Larger wire pots are 30 in. deep. The average production is about 5 tons an hour.

Galvanizing of Metal-Ware

Some extremely interesting examples are seen in the life of metal-ware galvanizing pots. A number of practical examples show that there are many other features of importance in pot life than production and fuel. No doubt a very close check-up of the furnace design would bring out some practical facts of great importance. The life of some typical metal-ware galvanizing pots is shown below:

LIFE OF METAL-WARE GALVANIZING POTS

Pot Number	Production Life	Time Life
1.		Average 18 Months
2.		30 to 36 Months
3.		4 to 8 Months
4.		18 to 24 Months
5.		18 to 36 Months
6.		7 to 12 Months
7.		4 to 11 Months
8.		24 to 30 Months
9.		18 to 24 Months
10.		24 to 60 Months
11.		18 to 24 Months
12.		18 to 24 Months
13.		24 to 36 Months

Here is a considerable variation in the life of the galvanizing pot, right in the same industry. The basic reasons for the difference are to be found in the kind of fuel used, and in the furnace design. These pots were fired with coke, coal, oil and gas—all the fuels.

A long and a short life may be found with any of the fuels, showing that the method of application of the heat was a very important factor in the destruction of the pot. The average life of a pot, however, for this field of the galvanizing industry should be about 18 to 24 months. From the examples cited, care and attention should prolong this life considerably.

In view of the fact that this industry is largely a piece-work industry, very few of the figures are expressed in pounds of production. The life is generally considered in time the pot lasts, rather than the tonnage put through it. An average daily production weight for pails would be 3000 lb., or $1\frac{1}{2}$ tons; for tubs it would be about 6000 lb., or 3 tons. Assuming an average of 2 tons a day, and 25 working days, the monthly production on a weight basis is about 50 tons. The production life of the average pot lasting two years, on that basis, would be 1200 tons. One thousand to 1500 tons is perhaps a fair average production life for a metal-ware galvanizing pot.

Pipe Fittings Galvanizing

"What is the pot life of a kettle galvanizing cast iron and malleable iron pipe fittings?" Some interesting practical data are found in this branch of

GALVANIZING pots last from a few days to three years. But the character of the work they are called upon to perform exerts a powerful influence upon their life. How the life varies with the duty is shown here. And the conclusion is that very short lives are due to abuse —over-heating, in short. Life as measured by tonnage of production is something different. It may be 20,000 tons for one class of work and only 500 tons for another. Some of the reasons for these discrepancies are discussed in the article.

hot galvanizing. The first fact is that, as a general thing, the life of this type of a galvanizing pot is not very long. Some actual pot lives as taken from this field are submitted below:

MALLEABLE AND CAST IRON PIPE FITTINGS
POT LIFE

Pot Number	Production Life	Time Life
1.	700 to 800 tons	3 Months
2.	1,500 to 2,000 tons	10 to 12 Months
3.	2,000 to 3,000 tons	4 to 6 Months
4.	900 to 1,200 tons	18 to 24 Months
5.	400 to 600 tons	4 Months
6.	1,400 to 1,600 tons	2 to 6 Months
7.	1,200 to 1,600 tons	9 to 12 Months
8.		24 to 36 Months

A casual glance at these figures shows two things—first, the production life is comparatively low, and second, there is considerable difference in the pot life from plant to plant. The pots with very short life are small, while the pots showing a long time life are larger. The smaller pots are 30 in. deep, while the larger ones are 42 in. to 48 in. One is 36 in. deep.

Average production life for this class of work would seem to be about 1000 to 1500 tons, and the average time life about nine to 12 months. This would be long for the small pots and a little short perhaps for the larger size. Most of these pots use gas as a fuel; two of them are coke-fired.

Some additional pots are on record, but they are for miscellaneous work and do not add anything to the data already given. The life of one doing job work is 18 months; another doing special work, 24 to 30 months. And the life of still another, doing refrigerator parts for electric refrigerators, is about 24 months. The fuels for these pots include gas and coke.

General Averages

About 60 galvanizing pots from all fields of the industry have been tabulated as to life under practical operating conditions. A general summary of the average life for each type of pot is listed below:

AVERAGE LIFE OF HOT GALVANIZING POTS

Type of Pot	Time Life
Sheet pots	8 to 14 Months
Pipe pots	6 to 12 Months
Structural steel	12 to 18 Months
Pole-line hardware (large)	9 to 12 Months
Pole-line hardware (medium)	9 Months
Pole-line hardware (small)	6 Months
Range boilers and tanks	18 Months
Electrical conduit	10 to 12 Months
Wire	6 to 12 Months
Metal-ware	24 Months
Castings	9 to 12 Months

Some general facts are illustrated by these figures. One of them is that the life of large-work pots is longer than the life in small work. This is due to the fact that the operating temperature as a rule is fairly low, and the production put through the pot is not large. Another fact very evident is that, the more production there is, the faster it is put through the pot, the shorter the life. Still another fact seems to be that the smaller the pot the shorter the life, and the larger the pot the longer the life.

It also seems to be pretty clearly demonstrated that a large metal volume in proportion to the production will give a long pot life. The opposite seems to be true, also—the smaller the metal volume, and the higher the production, the shorter the pot life. Those familiar with practical operations in hot galvanizing can see that the higher the operating temperature of the pot the shorter the life; and also the opposite, that the lower the operating temperature the longer the life will be. This fact is clearly illustrated by range boiler and tank pots. These articles go through the pot slowly, and the metal temperature is fairly low.

In considering pot life from the standpoint of fuels, coke gives the longest life as established by practice. Coal also gives a fair life, but the disadvantages of both these fuels are the lack of definite control, and the poor distribution of the heat. In addition to the dirt, ashes, etc., these fuels also are not very flexible, the pots losing temperature as production increases or continues. The one factor in favor of coke is that, from the standpoint of pot life, it is the safest.

Gas-fired pots have many advantages over coke and coal, but this fuel requires more skill in handling, to obtain the same pot life. The life of pots with this fuel vary from two days to two years, the average being perhaps a year or a little more. Oil is still harder to handle, as it has such a high unit calorific value, and the temperature required for galvanzing must be low to give a long pot life. However, once this fuel has been mastered, the pot life is comparable with that obtained with gas.

Electric heat can be distributed very uniformly, and can be controlled very accurately. The writer does not have any figures for the life of pots with this method of heating, but, with the proper furnace design, a very good pot life can be expected.

The even distribution of the heat, uniform application, and accurate temperature control at all times, are a distinct advantage of this type of fuel for galvanizing.

Assuming that an increased production will be accompanied by an increased operating temperature, which is usually the case in practical operation, it is interesting to estimate the pot life from a theoretical standpoint. The following table shows what life can be expected at various operating temperatures, with the standard 1 in. and 1¼ in. firebox steel side of the pot.

Estimated Life of Galvanizing Pot with Firebox Steel Sides

Temperature, Deg. F.	Thickness Lost Hourly, Inches	Estimated Life: 1-In. Steel Side Hours	1-In. Steel Side Days	1¼-In. Steel Side Hours	1¼-In. Steel Side Days
800	1/122880	122,880	5,120	153,600	6,400
850	1/12288	12,288	512	15,360	640
900	1/3072	3,072	128	3,840	160
950	1/614	614	25½	767	32
1000	1/1024	1,024	42	1,280	53
1050	1/896	896	37	1,120	47
1100	1/768	768	32	960	40
1150	1/672	672	28	840	35
1200	1/576	576	24	720	30
1250	1/480	480	20	600	25
1300	1/384	384	16	480	20
1350, 1400, 1450, 1500	Hourly loss is greater, and the time of destruction becomes less as the temperature is increased; no theoretical data				

Practical data agree very closely with the estimated life as worked out by experiments and tests at various temperatures. For example, the temperature of operation of a range boiler pot is somewhere around 850 deg. F. The average life for such a pot is about 18 months, or 540 days. This figure agrees well with the theoretical life for that temperature.

Again referring to practice, a pot which is turning out very small work is usually run at a high temperature, very close to 900 deg. F. The practical data show a life for these pots of about four to six months, 120 to 180 days, a figure which, also, agrees very well with the theoretical life for a temperature of 900 deg. F. It is obvious at once, from the figures and data submitted, that pots with a very short life have been greatly overheated.

Influence of Nickel and Manganese on the Properties of High-Speed Steels

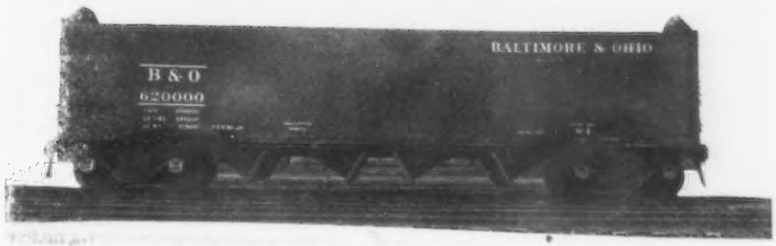
EXPERIMENTS on high-speed steels alloyed with 2 to 15 per cent nickel have been made by V. Ehmcke (*Stahl und Eisen*, Aug. 7, 1930) in a study of the hardening of high-speed steels. These alloys were compared with ordinary high-speed steel, a 10 per cent nickel steel, and several high-speed steels alloyed with manganese.

The quench hardness of high-speed steel alloys was found to become less as the nickel content increased. Steels containing 5 per cent nickel or more, when quenched from a high temperature, were entirely austenitic except for residual carbide from the Ledeburite eutectic. The hardness was therefore correspondingly low; with 5 per cent nickel it was 300 Brinell. By heating these quenched steels in the range 1100 to 1600 deg. F. the austenite is changed to martensite with an increase in hardness. After this treatment the 5 per cent nickel high-speed steel had a Brinell value of 575, but with increasing nickel content the austenite became more stable and the hardening less pronounced. Above 12 per cent nickel, austenite was considered the stable condition. Taking into account special properties of manganese, high-speed steels alloyed with this element behave similarly to those alloyed with nickel.

What Dilatometer Measurements Showed

Dilatometer measurements showed that the transformation of austenite to martensite in high-speed steel containing nickel occurred on cooling after heating in a certain critical range. For steels containing 5 per cent or more nickel this range was from 1300 to 1600 deg., while with 3 per cent nickel it began at 1100 deg. In ordinary nickel-free high-speed steel the transformation of quenched austenite to martensite associated with "secondary hardening" occurred in cooling from temperatures of about 1050 deg. This type of after-hardening must result from a separation of austenite into its component parts in the critical range. The expansion curves for high-speed steels, alloyed with considerable nickel, indicate that the disintegration is accompanied by precipitation of carbides. Thus the stability of the austenite suffers and cooling gives rise to martensite. The permanence of the martensitic hardness of the high-speed steels alloyed with nickel and manganese is not superior to that of the usual type.

Static and dynamic hardness tests, as well as high-temperature tensile tests, were made to determine the influence of nickel on these properties of high-speed steels. At 1100 to 1300 deg. the strength and hardness of these nickel alloyed steels were inferior to the same properties of the customary high-speed steels, in proportion to the nickel content of the former. However, at higher temperature the nickel addition had a distinctly beneficial influence, especially on the static hardness and the tensile strength. The effect of manganese was similar to nickel. The results confirm earlier findings that the highest strength above 1200 deg. is associated with the austenitic condition.



ALL-WELDED HOPPER CAR HAS GREATER LOAD CAPACITY

A 95-TON all-welded hopper car for carrying coal has been in use on the Baltimore & Ohio since its completion in October, 1929, and is said to have given excellent results in service. It is operated between the mines and the Curtis Bay coal tipple, near Baltimore. The car was designed in the mechanical engineer's office of the railroad and was built at the Mount Clare shops of the company.

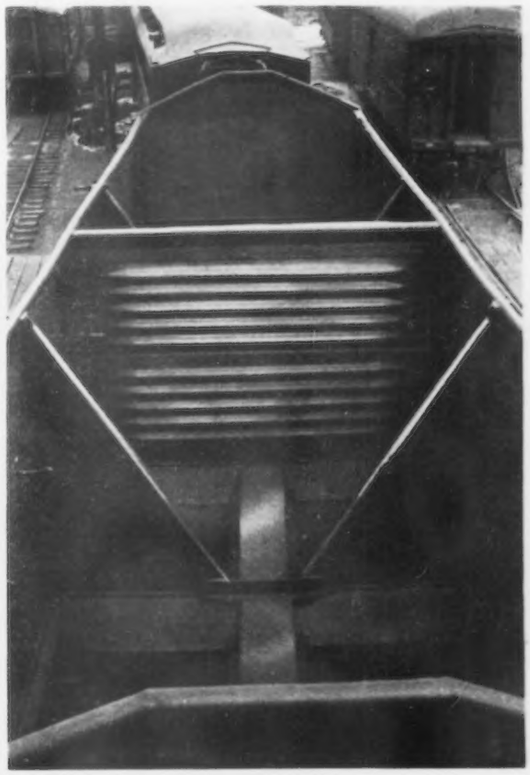
It was especially constructed to determine whether welded cars would resist, as well as riveted cars, the abuse to which all cars are subjected in service. A number of inspections have been made regarding the performance of this car, and up to the present all expectations are reported to have been met and the car has made a satisfactory record.

In general layout, the car has four transversely aligned hoppers extending along its central length between the trucks. Four additional corner hoppers are located between the bolsters and the ends of the car. These provide increased capacity and give also an end discharge of the load across the track.

FOUR central hoppers are supplemented by four corner hoppers in making this welded car self-clearing of its load. (Above)

Interior of the welded car, showing four gusset stiffeners and the corrugated transverse partition. Welding joins all these members, as well as the T-section vertical stiffeners, seen near the far end. (At Right)

End of the welded car, showing corner hopper doors at either side. The corner angles were welded, full length, to the plates forming ends and sides of car. (Below)



just as with the conventional hoppers. As the ends of the car are vertical, these corner hoppers make the entire car self-clearing.

Except for the hoppers themselves, the entire body has been assembled by welding. The sides of the car are flush, with T-section stakes (vertical frames or stiffeners) inside. At the ends, the sides are recessed for reception of ladders for use of the train crew. Generous vertical angles on outside of the steel plates at corners are welded their full length to side and end plates.

Transverse stiffening between sides, inside the car, is unusually complete and rigid. A transverse, corrugated partition wall at mid-length divides the car capacity space into two equal sections or units. Between this partition and the ends are four diagonal gussets, the two opposed gussets in each half of the car separating the successive central hoppers, as shown in the interior view.

With total capacity of 3507 cu. ft., the new car has an allowable load limit of 193,200 lb., on a weight of 57,800 lb. The ratio is 3.34 lb. of "pay" load for each pound of tare. This compares with 154,400 lb. allowable load limit on standard-construction hopper cars built by the railroad in the same year, with tare weight of 55,600 lb. Here the ratio is 2.78 to one. On the same tare ratio as the standard cars, only 160,700 lb. could be carried in the new car; or, alternatively, carrying 193,200 lb., it would weigh 69,500 lb., or nearly 6 tons more than it now weighs.

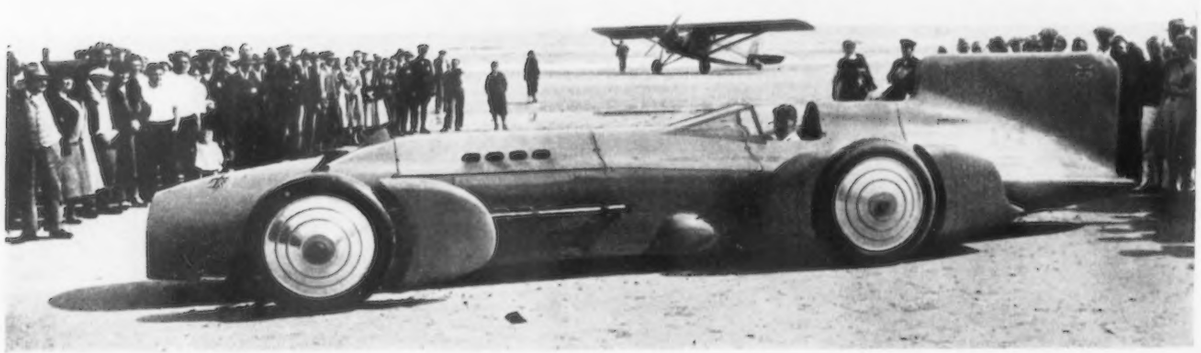
▲▲▲

Alloy Steels in Captain Campbell's "Blue Bird"

ALLOY steels were an important factor in the construction of the vital parts of the special automobile the "Blue Bird," in which Capt. Malcolm Campbell broke the speed record on Feb. 2 at Daytona Beach, achieving a speed of 245 miles an hour. According to a pamphlet issued by the International Nickel Co., as a reprint of an article in the January *Autocar*, the following alloy steels were used:

Part	Material
Engine:	
Pistons	Nickel-aluminum alloy
Crankshaft	Nickel-chrome-molybdenum steel
Connecting rods	Nickel-chrome-molybdenum steel
Clutch:	
Clutch disk	Oil hardening nickel-chrome-molybdenum steel
Clutch center	Oil hardening nickel-chrome-molybdenum steel
Flywheel hub	Oil hardening nickel-chrome-molybdenum steel
Gear Box:	
Spur gears	3½ per cent nickel-chrome case hardening steel
Main and layshafts	5 per cent nickel case hardening steel
Propeller shaft:	Air hardening nickel-chrome-molybdenum steel
Rear axle:	
Axle shafts	Air hardening nickel-chrome-molybdenum steel
Bevel gear and pinions	5 per cent nickel case hardening steel
Steering gear (Marles):	
Cam and roller	3½ per cent nickel-chrome-case hardening steel
Rocker shaft	Oil hardening nickel-chrome-molybdenum steel
Steering:	
Arm, levers, etc.	Oil hardening nickel-chrome-molybdenum steel
Front axle:	
Swivel	Oil hardening nickel-chrome-molybdenum steel
Ends	Oil hardening nickel-chrome-molybdenum steel
Center	Oil hardening nickel-chrome-molybdenum steel
Chassis:	
Main frame and tubular cross members	3 per cent nickel steel
Sub frame	3 per cent nickel steel
Miscellaneous:	
Control levers	Oil hardening nickel-chrome-molybdenum steel
Shackles, studs, bolts	3 per cent nickel steel

The statement is made that the major part of the steel for the engine and all the other steels were furnished by the English Steel Corpn., Ltd., Sheffield, England



New Jig Borer Features Vernier Scales and Electric Table Stop

AUTOMATIC table positioning through an electric stop mechanism in connection with vernier scales is a feature of the Kellocater jig boring machine, here illustrated, which is being announced by the Keller Mechanical Engineering Corpn., 70 Washington Street, Brooklyn, N. Y. Intended to promote speed and economy in precision jig boring and layout work, the machine incorporates several new features.

Vernier scales for the longitudinal and transverse table movements are the only measuring devices on the machine. Settings are made, without moving the work or the table, by adjusting the vernier slides to the desired position. Reading of the scales is facilitated by a ten-power flat-field magnifying glass, free from visual distortion and fitted with a built-in electric light. An adjusting screw is provided so that the vernier and scale may be lined up to the nearest even inch, making it unnecessary for the operator to add or subtract decimal fractions in determining successive locations. Dimensions may be read directly from the blueprint and the vernier slides set accordingly.

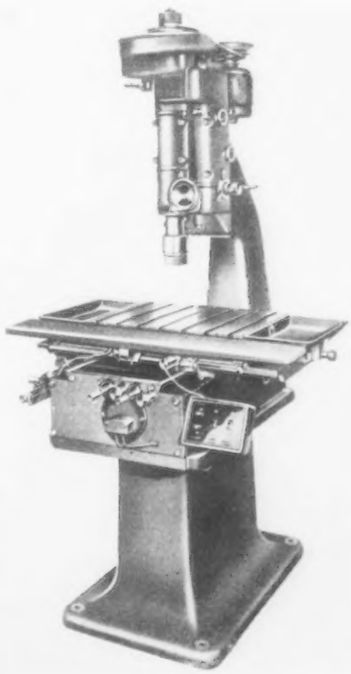
After the vernier slides have been set, movement of the table is started by snapping a toggle switch. Uniform speed is obtained by means of a lead screw driven through a magnetic clutch. As the table approaches the predetermined position, an electric contact member, mounted on the table, touches an anvil on the vernier slide, causing the clutch to be released and stopping the table at the desired position, within limits of 0.0002 in.

This automatic table stop, in combination with the automatic reversible spindle feed, permits the operator to set the table for the next operating position while a hole is being machined. It is pointed out that, because of the independent scales used in positioning the table, precision is not impaired by wear of the lead screws or other moving parts. Precision is further aided by a table lock designed to prevent slippage of the table over an oil film.

The spindle is made of chrome-nickel steel and equipped with ball bearings. Eight spindle speeds, from 77 to 1750 r.p.m., are obtainable; four through open belt and four through back gear drive. Reversible, automatic feeds of 0.002 and 0.005 in. are obtainable, as well as manual feed through handwheel or handlever. An automatic, positive depth stop with scale and pointer is attached to the spindle head.

The table driving mechanism, including the magnetic chuck, is inclosed in the rigid box-shaped bed. The ½-hp. spindle-drive motor is mounted on a hinged bracket having provision for belt tension adjustment. The overarm is properly gibbed and

SETTING the verniers of the Kellocater jig borer shown below. Precision positioning of the heavy table is then accomplished automatically by electric drive.



furnished with a crank for vertical adjustment of 6 in.

Specifications include: Table travel, longitudinal, 18 in.; transverse, 12 in.; table working surface, 14 x 21 in.; vertical distance from table top to spindle end, 2½ in., minimum, 14½ in., maximum; from spindle center to face of column, 14 in.; vertical adjustment of spindle bracket, 6 in.; spindle quill travel, 6 in. Overall dimensions are 45 x 55 x 78 in. high; the machine weighs 1375 lb.

The electrically controlled automatic stop used on the Kellocator is available for installation on horizontal boring machines, millers and other equipments. It is pointed out that with this stop the heavy moving table may be brought to precise location automatically, thus eliminating laborious adjustment and painstaking measuring and checking.

▲▲▲

Abrasive Wheel Extends Range of Cut-Off Saw

AN abrasive cutting wheel, offered by the Hunter Saw & Machine Co., Pittsburgh, for use on its regular No. 6 cut-off machine, makes it possible to cut solid rounds up to 2 in. in diameter. The new wheel merely replaces the standard 18-in. saw used for cutting light sections, angles and pipe, thus increasing the range of work that can be handled on the one machine.

The same spindle speed results in proper rim speeds for both the 16-in. wheel and the 18-in. saw. The driving mechanism, therefore, requires no change and, as the driving flanges of the saw and the grinding wheel are identical, no special attachments are required. A new guard, however, has been devised to provide more complete safety for the operator.

▲▲▲

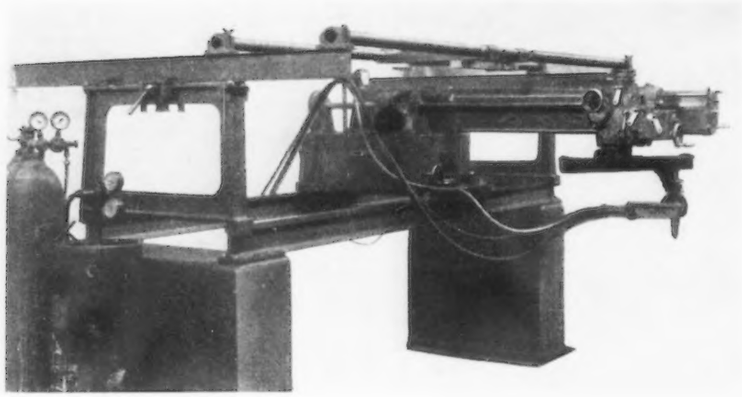
To Discuss Lubrication

Lubrication research will be the topic of the morning session of the lubrication meeting to be held at the Pennsylvania State College, State College, Pa., May 22.

Internal combustion engine lubrication will be discussed in the afternoon. At the latter session, C. M. Larson, Sinclair Refining Co., will speak on "Pennsylvania Oils"; E. R. Lederer, vice-president Texas Pacific Oil & Coal Co., on "Mid-Continent Oil"; and A. L. Clayden, Sun Oil Co., will discuss "Coastal Oils." Following an informal dinner in the evening, machines and apparatus in the lubricating laboratory will be inspected. The lubricating engineering committee of the petroleum division of the American Society of Mechanical Engineers is cooperating.

▲▲▲

Simplified practice recommendation R94-30 covering open-web steel joists is now available in printed form. It can be obtained from the Superintendent of Documents, Government Printing Office, Washington, for 5c.



Oxy-Acetylene Cutting Machine Operates Automatically

AN oxy-acetylene cutting machine having an automatic compound traversing head for use either with or without templets has been placed on the American market by Jos. C. Paulus & Co., 2507 Potter Street, Philadelphia. The machine, of German manufacture, is made in 39, 54 and 70-in. sizes. The longitudinal cutting capacity is unlimited, as the machine is mounted on a rail track which may be extended to any length required.

A variety of work, including 45-deg. angle, bevel and circular cuts, may be done without the use of a templet through the automatic feeding motions of the cutting head, which is mounted on an overhanging slide, as shown. The speed of the longitudinal, cross and circular motions may be regulated as required by adjustment of the friction drive from a ¼-hp. motor inclosed in the carriage. Longitudinal feed is obtained by movement of the entire carriage along the rails. Cross-motion is provided by the traverse mechanism. The vertical spindle of the cutting head carries at its lower end an adjustable radius arm to which the torch is attached, thus permitting circular cutting to a radius equal to or less than the length of the radius arm. Cutting speeds may be adjusted by means of a conveniently located hand wheel; a tachometer at the top of the carriage indicates the speed obtained.

For automatic cutting of irregular outlines, a templet-holding-frame is provided. This frame, which rests on the track and straddles the carriage, is shown in the illustration. The templet is clamped to the two rods attached to the two transverse I-beams which are mounted on rollers. In operation, the templet is positioned over the cutting head and the holding frame clamped. By means of a follower in contact with the templet, the torch is guided in the exact outline of the pattern.

All parts not subject to wear are made of Silumin, a light alloy.

▲▲▲

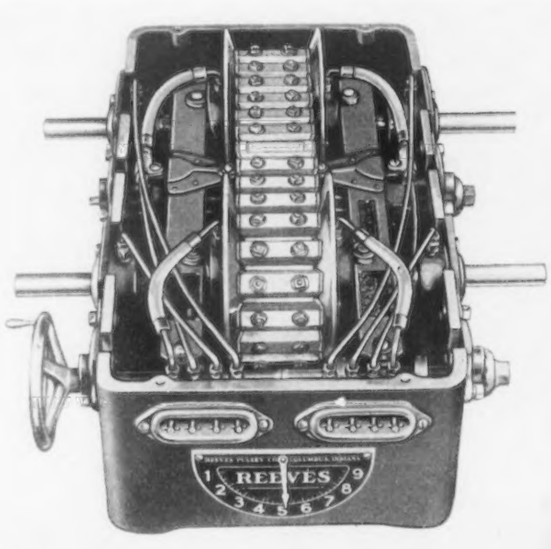
Inclosed Variable-Speed Transmission Is Centrally Lubricated

GREASE lubrication through a centralized system and total inclosure of all operating parts in a symmetrical cast-iron housing are features of the improved variable-speed transmission recently announced by the Reeves Pulley Co., Columbus, Ind. The accompanying illustration of the new model with the cover of the case removed shows the transmission mechanism which is of the same type as other Reeves units.

Although protected from water, fumes and abrasive dust, the operating parts are accessible and may be removed as a unit with the shaft bearings and the shifting and belt tightening screws. A removable lid on the upper section permits belt removal and minor adjustment without taking off the entire cover. Adjustable motor rails may be installed on the cover at each side of the lid, leaving the latter accessible for removal. A complete motor unit or auxiliary countershaft may be mounted on these rails by means of slotted cross rails.

Eight force-feed grease fittings, grouped as shown in two recessed panels at the [illegible] the casing, provide complete lubrication of all bearings. From these fittings rigid copper tubes lead to the four radial shaft bearings and flexible copper tubes lead to the four thrust bearings around the disk hubs. Through openings in the thrust bearings lubricant is also forced into the spiral grooves of the disk hub bores, thus lubricating the hubs, shafts and driving keys.

Variable-speed transmissions of the inclosed type are made in six sizes for fractional to 10-hp. service at various speeds. They can be mounted on floor, ceiling or wall as required.



▲▲▲

EIGHT force-feed grease fittings grouped in two recessed panels provide for ample lubrication of all bearings.

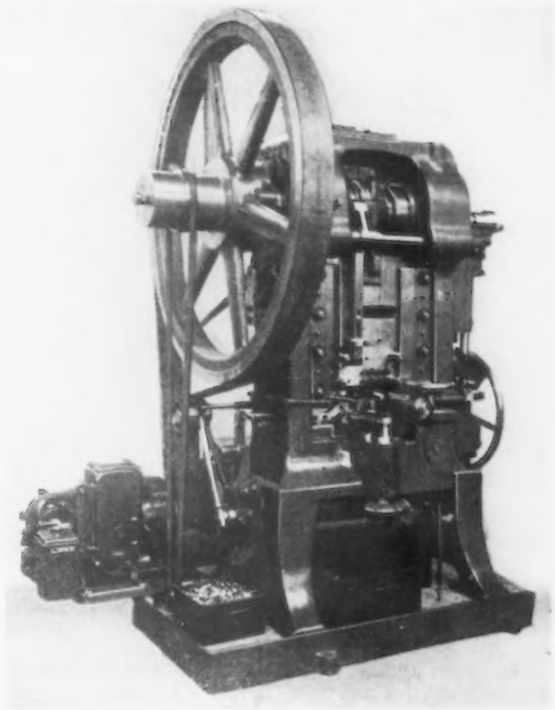
Automatic Machine Produces Cold-Pressed Double Chamfered Nuts

AN automatic "universal" nut press which produces cold-pressed nuts chamfered on both sides has been placed on the American market by M. A. Irmischer, 30 Church Street, New York. The machine is made by the Malmedie & Co., Düsseldorf, Germany.

The nuts are formed from coiled stock and two vertically alined trimming dies, which attack the nut from top and bottom, complete the process. By dividing the trimming operation in this way, a clean shave of the nut sides is obtained. An output of 90, 80 and 70 units a minute, respectively, is attained in the production of ¼, ⅜ and ½-in. nuts.

The press is also suitable for the production of cold-pressed nuts chamfered on one side. Only one tool has to be exchanged for this purpose. The vertical construction of the machine is emphasized as facilitating operations, both the tools and the working mechanism being accessible. Two or more machines can be operated by one attendant.

The electric motor drive is equipped with safety devices to prevent damage from obstructions to the movement of the dies. A gear pump supplies oil under pressure to cool the dies.

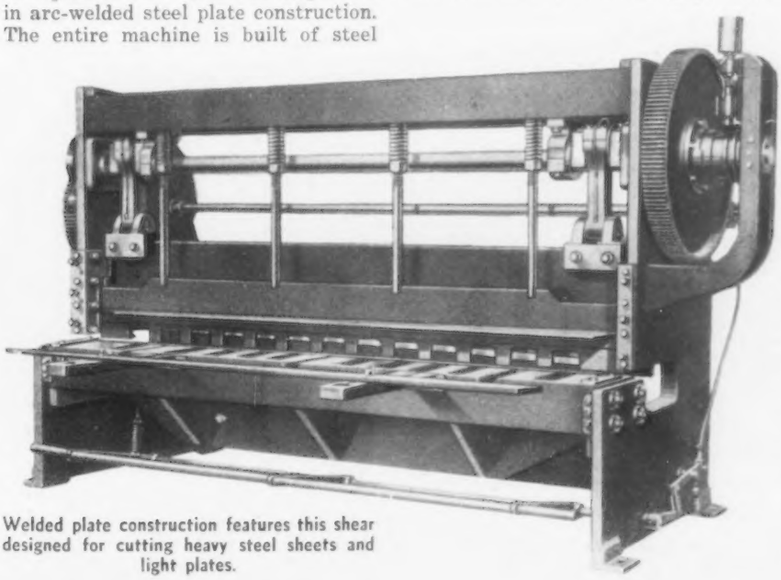


THE nuts are formed from coiled stock. Two vertically aligned trimming dies that approach the nut from top and bottom assure clean cutting.

Sheet-Steel Shear Is Built of Welded Plates

A NEW steel power squaring shear has been put on the market by Dreis & Krump Mfg. Co., Chicago. It incorporates the latest developments in arc-welded steel plate construction. The entire machine is built of steel plates welded into a solid unit. The bed and top leaf have welded cross bracing and the housing has a welded reinforcement around the gap. The gears, also, are made of rolled steel sections and welded.

These machines are to be furnished in sizes from 36 in. to 168 in. in length and in capacity to shear steel from No. 14 gage to 1 in. thick. On account of the steel construction the weight is approximately three-fourths that of cast iron shears of the same capacity. The lubrication is by centralized system to all moving parts. The hold-down is so constructed that full pressure is applied before the knives start to cut. Clutch is positive jaw type. Machines are driven by forged crankshafts.



Welded plate construction features this shear designed for cutting heavy steel sheets and light plates.

Submit Chuck Standards for Comment

The tentative American standard for chucks and chuck jaws has been released for criticism and comment by technical committee No. 11 of the sectional committee on small tools and machine tool elements of the American Society of Mechanical Engineers.

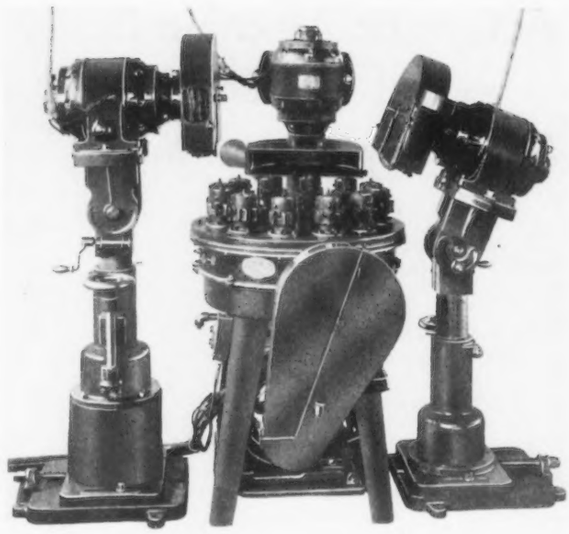
This proposal contemplates the standardization of chuck diameters, 11 sizes, ranging from 6 to 36 in., having been fixed. It tabulates dimensions for master jaws and removable top jaws, these having been determined with a view to obtaining interchangeability of the latter over a considerable range of chuck size and covers some of the detailed dimensions of some of the other elements involved.

Copies may be obtained from C. B. LePage, assistant secretary of the society, 29 West Thirty-ninth Street, New York.

Builds Three-Wheel Eight-Chuck Polishing and Buffing Machine

A POLISHING and buffing machine made up of three individually motor-driven wheel units grouped around an eight-spindle indexing work-holding table has been placed on the market by the C. I. Packer Tool & Die Co., Meriden, Conn.

This machine, designated as the Cipco, is offered for the finishing of metal or composition parts having a diameter of 7½ in. or less. Advantages claimed include increased production and savings in labor and uniform finish, as compared with hand finishing.



FLEXIBILITY of the wheel units is provided by angular, vertical and other adjustments. Although shown with 12 work spindles, eight spindles are standard.

Each spindle of the eight-spindle work table is equipped with an automatic expansion chuck for holding the work being polished. Three spindles are at all times directly in front of the operator; in this position spindle revolution ceases and the chuck jaws are contracted automatically. This action, affecting three spindles simultaneously, allows the operator ample time for removing and reloading the work. The period of dwell, or the time the work is in contact with the wheels, may be varied to suit the nature of the work and the finish wanted.

Expansion of the chuck jaws takes place automatically just before the work makes contact with the first wheel. The chuck jaws are furnished with adaptors which are made to fit the work. These adaptors are fastened to the main jaw of the chuck by dowel pins and screw and may be removed and reassembled quickly.

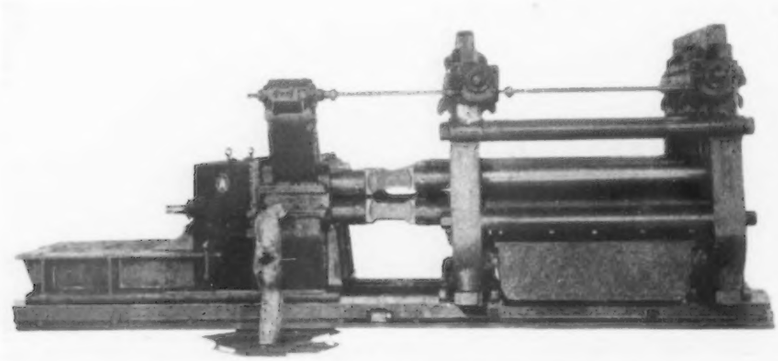
Arrangement of the individually motor-driven wheel units may be seen in the illustration. Three or 5-hp. 1800-r.p.m. ball-bearing dustproof motors are employed for the wheels. The wheel-head of each unit has a swivel angular adjustment and, in addition, has vertical adjustment through upright jacks. These, with the lateral adjustment of the entire unit on its base, are emphasized as providing maximum flexibility for each wheel unit. Each wheel is controlled by a separate switch.

The work-holding table is driven by a 2-hp. four-speed motor through gearing which permits the table to revolve with intermittent action. This gearing is mounted directly beneath the table top and runs in a bath of oil.

Electric control includes a starting switch and a four-speed controller for the table motor, starting switches for the wheel motors and a push-button switch for emergency use. Floor space of 60 x 72 in. is required for the machine, which weighs 2513 lb. net.

Leveling Machine in Two Sizes for Plate, Heavy Sheets and Strip

LEVELING of heavy sheets and plates in plate mills, fabricating shops and heavy sheet and strip mills is facilitated by two new-type plate leveling machines put out by the Aetna-Standard Engineering Co., Youngstown. The larger unit will level hot or cold plate and heavy sheets and strip from ½ in. to 1¼ in. thick and up to 96 in. wide. The smaller one will handle material from ⅛ in. to ½ in. in thickness and 96 in. in width.



The two machines provide for leveling 96-in. wide material from ⅛ to ½ in. and from ½ to 1¼ in., respectively.

The larger unit, shown here, has 11 leveling rolls 14 in. in diameter by 100 in. long. Six are mounted on the top and five on the bottom. There are also two pinch rolls for feeding the plates into the machine. All the rolls are driven by spindles and are carried in cast steel boxes and fitted with roller bearings. Steel forged rolls are used throughout.

Roll adjustment is of the motor-driven type, with individual hand regulation, so that the rolls may be adjusted for perfect parallel alinement. The top rolls are counterbalanced by means of cast iron counterweights, levers of which are mounted with roller bearings.

All drive gears are carried on forged steel shafts with roller bearings and are inclosed in cast iron housings and lubricated by means of the splash system. The gears are of the single-helical type, accurately cut and heat treated. The roll housings are of heavy cast steel with individual housing caps and are mounted on heavy cast iron mill-type housing shoes.

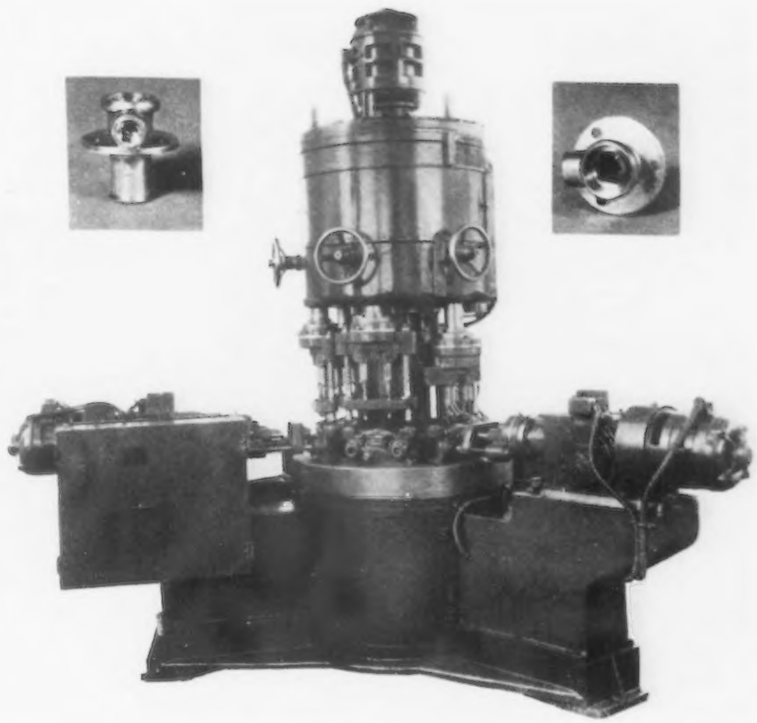
Vertical Automatic for Multiple-Operation Work

MULTIPLE operations in one or more holes of a given part may be performed on the vertical automatic here shown, which has been developed by the Ex-Cell-O Aircraft & Tool Corpn., Detroit.

The machine illustrated is equipped with three auxiliary horizontal units to drill, ream and tap a horizontal hole in the part shown in the two small views. The vertical spindles are contained in a single unit in the upper part of the machine and are driven by one motor. The speed of these spindles may be changed by means of pick-off gears selected to suit the job and can be arranged for either multiple-head or single-spindle mounting. This makes it possible to time the cycle of one unit with relation to the others for handling different operations such as drilling, tapping, reaming or counterboring.

On the machine illustrated, all the units are equipped with multiple heads having from two to four spindles. Each of these heads is equipped with spring guide bars and bushing plates. The guide bars not only carry the bushing plates, but also assure proper alinement between the drill head and the fixture as the work is indexed from one station to another.

One loading and four work stations are provided on the rotary table which carries fixtures for holding the work. Each fixture holds two parts. Four operations are performed by the vertical units and three by the horizontal units. In the set-up illustrated, the vertical operations consist of drilling, reaming and tapping a central 15/16-in. hole, and drilling three 13/16-in. holes in the flange of the part. The three horizontal units are for drilling, reaming and tapping the ½-in. hole at right angles to the axis of the part.



Four operations are performed by the vertical units and three by the horizontal units. The five station rotary table carries the work-holding fixture. The entire operating cycle is electrically controlled.

The base of the vertical unit contains the index mechanism and table rotating motor, access to which is obtained through large doors between each horizontal unit. Suitable space is provided for the coolant pump and sump. A circulating lubricant pump delivers oil to a reservoir at the top of the unit from which it is distributed to the various parts.

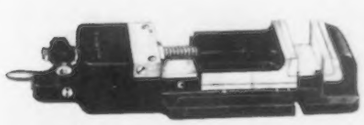
The entire operating cycle of the machine is electrically controlled and safeguarded by a system of relay switches mounted in the panel box which may be seen at the left in the illustration. It is impossible to index the table while the spindles are in operation or to start the feed while the table is indexing. The control lever for starting and stopping the machine is located in a convenient position for the operator. If required for vertical operations only, the machine can be furnished without the horizontal units.

▲ ▲ ▲

Milling Vise Has Low Clearance Height

PNEUMATIC operation without sacrificing the advantages of the low height and clearance of a hand-operated vise is obtained in the Hopkins milling machine vise brought out by the Tomkins-Johnson Co., Jackson, Mich. The pneumatic mechanism does not project above the level of the jaws, thus permitting milling cutters to pass completely over the vise.

The removable steel jaws of hardened steel, 6¼ in. wide x 1 11/16 in. high, may be replaced by special jaws to grip work of odd shape. A ⅛-in. power stroke is provided, and the vise is described as producing a gripping force of 14,930 and 44,100 lb. with air pressures of 30 and 80 lb. respectively. The distance between jaws is adjustable to a maximum of 4 in. The base measures 7 x 24⅝ in. The maximum height of the vise is 5¼ in.



▲ ▲ ▲

Indicator Finger for Gaging Inaccessible Surfaces

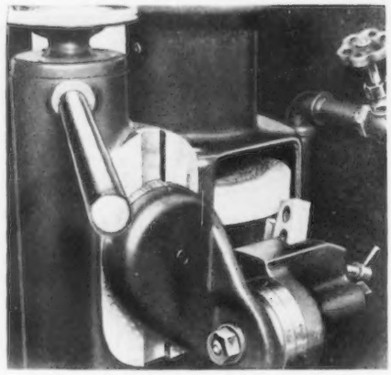
THE Barber-Colman Co., Rockford, Ill., has brought out an indicator finger which, arranged as shown, facilitates the gaging of surfaces that cannot be reached by the usual indicator.

This attachment consists of a bell-crank made of tool steel pivoted to a forged steel bracket for clamping to the case barrel surrounding the indicator plunger. The clamping hole is made to fit a 9/32-in. diameter barrel. Operation of the unit, which accurately transfers any movement of the ball end of the bell-crank to the indicator plunger, is clearly indicated in the illustration. A stop lug prevents the bell-crank from dropping below its normal working position.

Grinder for Sharpening Gleason Generator Tools

THE No. 12 generator tool sharpener recently brought out by the Gleason Works, Rochester, N. Y., is intended for use on tools of any of the Gleason straight bevel generators and the 60-in. spiral bevel gear planing generator.

Only one grinding wheel, of the standard 7 x 2 x 1¼ in. cup type, is used to sharpen both of the tools for cutting the opposite sides of gear teeth. In operating the machine, the tools are placed in pivoted holders and moved across the edge of the wheel by hand. The feed into the wheel is obtained by a handwheel on the top of the bracket on which the tool holders are mounted. The grinding is always against the cutting edge of the tools.



Tools to be sharpened are mounted in pivoted tool holders, as shown in the close-up view, and moved across the edge of the grinding wheel by hand.

The machine is equipped with a belt driven pump for delivering coolant to the point of contact between the work and the cutting wheel. Guards are provided for safety and to prevent splashing of the coolant.

Tools can be ground to any side rake angle by loosening a nut on the tool holder and turning the tool to the desired angle, as marked on the collar. The front rake angle is obtained by a similar setting at the point where the tool holder is attached.

Three different pairs of tool holders can be used, but only one pair is furnished as standard equipment. One pair of holders serves for the tools of the 60-in. spiral bevel gear planing generator, one for the tools used on the 25-in. bevel gear generator and the third for the tools used on the 8-in. manufacturing bevel gear generator, the 3 and 12-in. bevel gear generators and the old style 6, 11 and 18-in. bevel gear generators.

The ball-bearing equipped wheel-spindle is belt driven by a 1-hp., 1500 to 1800-r.p.m. constant-speed motor mounted in the base of the machine. A magnetic reversing switch which fits in the base is standard equipment. Floor space required is 32 x 36 in.; the machine weighs 1800 lb.

▲▲▲

Improved Oilgear Constant-Pressure Pump

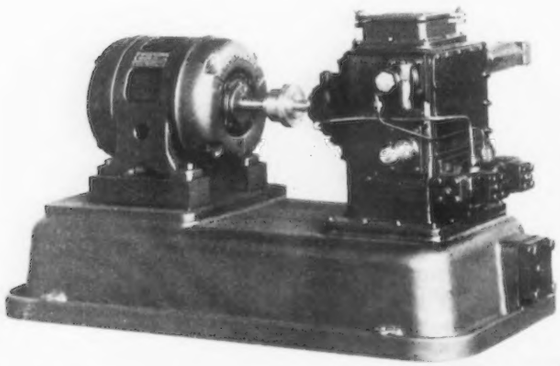
CONSTANT-PRESSURE pumps made by the Oilgear Co., Milwaukee, are now equipped with an improved high-pressure, variable-delivery pump unit and an improved pendulum assembly having direct suction. They are suitable for use on horizontal and vertical honing machines, presses, die casting machines, furnace doors and other equipment.

Three models are made, designated as types WES-5, WES-6 and WES-6 Special, with displacements of 3600, 3400 and 4800 cu. ft. per min., obtained at speeds of 860, 600 and 860 r.p.m., respectively. Maximum continuous working pressure is 1000 lb. per sq. in., the first two models will provide 1500 lb. on intermittent service.

All models are equipped with automatic pressure-type controls, whereby the maximum pressure can be maintained indefinitely without overheating, loss of power or attention from the operator. Instant release of oil pressure is obtained by means of a bypass. A peak relief valve, installed inside the pump casing, protects the work, machine and pump from overloads. The 4½-gal. oil reservoir is flanged to the pump casing, and is equipped with suitable lugs for mounting the pump.

The drive may be by belt, chain or direct connection to any constant-speed source. The pump illustrated is direct connected through a Falk coupling to a 7½-hp. constant-speed motor. The large base of this machine serves as a reservoir for 6300 cu. in. of oil.

Built into the drive shaft end of the pump casing is a small auxiliary gear pump for supercharging the high-pressure unit. The piston of the high-pressure pump unit operates at 4300 piston strokes a minute, which assures a smooth and constant volume of oil at any pressure up to the maximum setting of the pump unit. The power required is in direct proportion to the work to be performed. Although the maximum requirement is 15 hp., it is pointed out that a 7½ or 10-hp. motor is sufficient for most installations.



▲▲▲

CONSTANT-PRESSURE variable-delivery pump for honing machines, presses, die casting and other machines.

HOW TO WIN THIS WAR

NOT all wars are announced by formal declaration. America has been at war for the past 19 months, although many do not know it. The casualties we have suffered in the great economic struggle have been fifteen times as great as those that we experienced overseas in 1917-1918. At least five million Americans have been rendered hors-de-combat in the struggle to make a living. This vast army is now undergoing economic hospitalization. Dole or no dole the rest of the nation must pay for taking care of this army of industrial disabled.

In dollars, too, a depression can be as costly as war. The past 19 months have cost us nearly that many billions in depleted purchasing power. How can we make up for this huge loss?

There is but one way to do it. We must win this economic struggle and then rebuild in the same way that we have always built.

In wars between nations, the victory goes to the one which most effectively designs and uses the improved engines and tools of destruction. Economic wars can be won and rebuilding done only by most effectively using the improved machinery and tools of construction and production.

It is futile to attempt to win this war by lessening the fighting power of our industrial army through wage reductions. That is not the way any wars are won. The thing to do is to give the soldiers better equipment.

Fully half of our twenty billion dollar total of investment in manufacturing machinery and tools is obsolete today, regardless of its age. It is obsolete because design, invention and construction have produced more recent outstanding cost-cutting improvements.

Replacing American industry's obsolete equipment with improved machinery and tools now available is the way to win this economic war and to rebuild prosperity. The resulting cost savings would run into billions, the investment would profitably solve the problem of the plethora of idle funds and reabsorb our surplus of idle labor. And American industry would be placed upon an efficiency level that would assure the continuance of progress for years to come.

And the same strategy that would win this war for the nation will win it for the individual industrial plant.

By
JOHN H. VAN DEVENTER
Industrial Consultant
The Iron Age

Copies of this editorial may be secured from the Reader Service Dept. of The Iron Age, 239 West Thirty-ninth Street, New York.

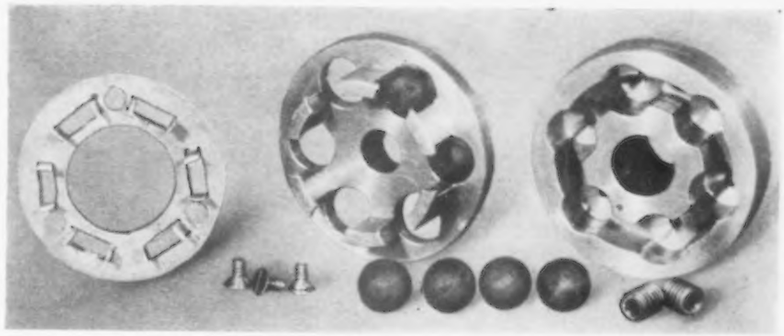
Rubber Balls in Coupling Absorb Operating Shocks

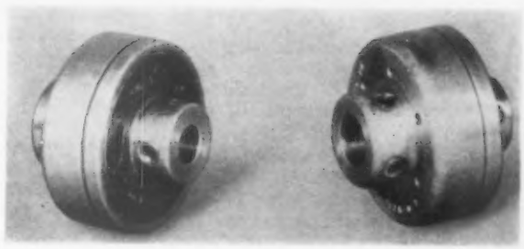
THE Edmunds flexible coupling, recently brought out by the Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., is intended to provide maximum shock absorbing properties. The flange half of this coupling, shown at the right in the disassembly view herewith, has six cylindrical pockets, all of which are parallel to the shaft and connected by a circular groove. The other half, or spider, has six projecting lugs between which are placed rubber balls to absorb the shock.

When the coupling is assembled, the balls occupy the pockets in the flange and, as torque is applied, the lugs on the spider half squeeze the balls which carry the load to the other half of the coupling. All the balls are in compression regardless of the direction of rotation.

The balls may be removed without disturbing the position of either half of the coupling on the shaft. This is accomplished by taking off the cover shown at the left in the disassembly view. The balls may then be pushed out through holes in the spider half by means of a rod inserted through small holes provided in the flange half.

With the balls removed, the driving shaft is entirely disconnected from the load, a feature useful for testing purposes.





Under normal conditions the rubber balls have a long life. They can be removed conveniently without disturbing either half of the coupling.

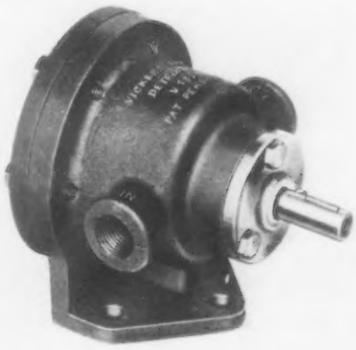
▲ ▲ ▲

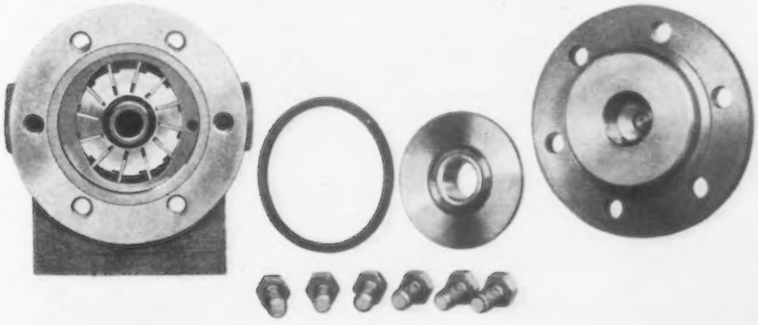
Pump for Hydraulic Feeds and Controls

HIGH volumetric efficiency, 500 lb. per sq. in. continuous working pressure and 1000 lb. for press work, high mechanical efficiency, and long life with quiet operation are claimed for the V-type rotary pumps which are being placed on the market by Vickers, Inc., 7752 Dubois Street, Detroit. Two sizes, with capacity for 15 and 30 gal. per min. at 1000 r.p.m., respectively, are now available for use on machinery incorporating hydraulic feeds and controls.

Arrangement of the pump may be seen in the illustrations. All working parts can be removed from one end without disturbing motor connection or pump piping. The harmonic curves in the ring at the ports are said to provide balanced pressure on both sides of the vanes, thus increasing mechanical efficiency and eliminating side thrust and consequent wear on bearings. All parts are interchangeable, and larger capacity can be secured by changing the internal parts. Compactness is a feature.

The rotor, ring and vanes are alloy steel, hardened and ground, while the port bushing and flange bushing are of hydraulic bronze. The body is of special high-test nickel cast iron. Packing is not under oil pressure and the body is completely drained to eliminate oil leakage. The weight of the pump is 32 lb.





Working parts are interchangeable and can be removed from one end without disturbing motor connection or pump piping.

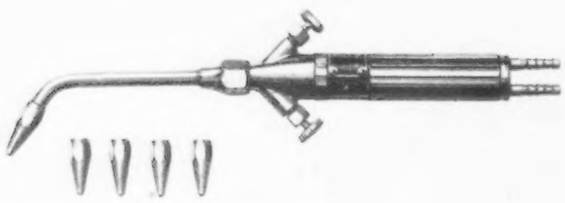
▲ ▲ ▲

New Keller Machines Now on Exhibition

THE type GG-1210 automatic toolroom machine and the No. 3 Kellocater jig borer, both new products of the Keller Mechanical Engineering Corpn., Brooklyn, are being exhibited this week at the plant of the Doyle Machine & Tool Corpn., Syracuse, N. Y. The Monarch Machine Tool Co., Sidney, Ohio, is cooperating with the Keller company in demonstrating the Monarch-Keller automatic form turning lathe.

A similar exhibition is being held at the showrooms of the Motch & Merrywether Machinery Co., 2842 West Grand Boulevard, Detroit. This exhibit, which will continue through May 1, will not include the automatic form turning lathe, however, which will be demonstrated by the Monarch company in Detroit at a later date.

Both exhibitions feature the production of a wide variety of punches, dies and molds, the automatic milling of irregular shapes, including spinning dies and the turning and relieving of form cutters. Demonstrations include actual samples of dies and other pieces produced in the plants of visitors.



SMALL and light in weight, this blowpipe is adapted for airplane and other accurate welding.

Blowpipe for Aircraft Welding

A NEW blowpipe, designed primarily for airplane fuselage welding but suitable also for the welding of light sheet metal parts of all kinds, has been added to the Prest-O-Weld line of Linde Air Products Co., 205 East Forty-second Street, New York.

The gases entering the blowpipe mix immediately in front of the handle, the oxygen and acetylene valves being so located that they can be readily adjusted by the thumb and forefinger of the hand which holds the tool. Being 10½ in. long, weighing 10 oz., and being carefully balanced, this blowpipe, designated as type W-107, is especially adapted for fine and accurate work.

▲▲▲

Collapsing Tap for Two-Diameter Work

STRAIGHT or taper threads may be cut on two diameters simultaneously by means of a combination collapsing tap which has been placed on the market by the Geometric Tool Co., New Haven, Conn. The tool illustrated, designated as the 3 and 4-in. "SD" tap, is equipped to cut a 3 11/16-in. and a 4⅝-in., 12 U. S. S. thread at the same time. The chasers engage with the work simultaneously, or at such prearranged times as necessary to complete both threads at the same time.

Although the tap has many possible applications, several factors limiting its use are pointed out. For example, the pitch of the threads must be the same and the two threads must be far enough apart to permit use of two sets of chasers and two complete plungers for holding the chasers in the tool.

The tool may be used as a plate-trip, hand-reset tap in a stationary machine, or as a rotary tap with plate-trip and automatic-reset in a chucking machine. The chasers have independent size adjustment; those in front are adjusted through the cap and the back set is adjusted by means of a ring on the body of the tap. Both sets of chasers collapse at the same time, this action being brought about either by contact of the trip plate with the face of the work, or through the use of a fork operating in the groove of the closing sleeve.

▲▲▲

Pneumatic Cylinder Packing Cups

PACKING cups made of a special composition bearing the trade name "Wabco" have been placed on the market by the Westinghouse Traction Brake Co., Wilmerding, Pa.

These cups are intended for use in pneumatic cylinders of hoists, chucks, clamps, and other devices, in sizes ranging from 1 to 26 in. diameter.

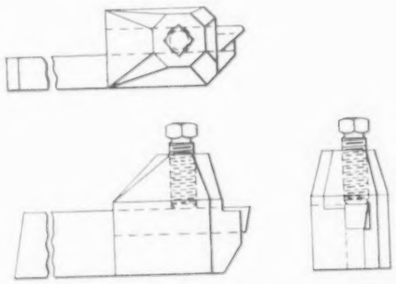
The packing cups are reinforced with strong, open mesh cord fabric uniformly distributed throughout the section of the material. Each thread is thoroughly embedded in the composition and the whole is molded to the desired form. The composition is the same as that used for making packing cups for air-brake cylinders. It is said to be effective in making and holding an air tight seal. The material is durable, non-porous, and resistant to oil, moisture and variations in temperature.

Flat and beaded gaskets, as well as valve seats and similar articles, made of the "Wabco" composition, also are available. The gaskets are described as being "non-blooming," and will not become sticky or flabby.

▲▲▲

Announces Tool-Holder for Tungsten-Carbide Bits

TUNGSTEN - CARBIDE bits are firmly held in the tool-holder here shown, which was developed by the Ready Tool Co., Bridgeport, Conn.,



for use in place of large brazed tools. With tool-holders of this type, the bits are inserted directly in the holder and supported as shown in the accompanying sketch of the straight-type holder. Right and left-hand tools of offset as well as straight styles also are obtainable.

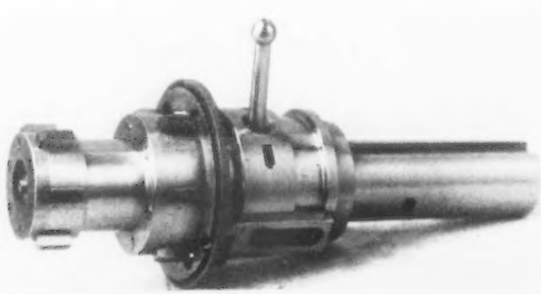
In addition to the support provided on the bottom to withstand the pressure of the work during a cut, the side of the bit is backed up to take the strain of feeding the cutter into the work. The hole for the cutter may be broached with a back slope or angle, if desired.

These tool-holders, made of chrome-nickel steel, may be obtained with any size of shank and with holes to accommodate the size of bit desired. The most common sizes are 1¼ x ⅝ in. and 1 x ½ in. The tools may be designed to take oversize bits if required.

The tungsten-carbide bit is clamped in the holder by a "Mac-it" set screw of the same type used in other "Red E" tool-holders. It is pointed out that these set screws will not mash down or break in service.

▲▲▲

Ingersoll-Rand Co., New York, has received a contract for all of the air compressor and rock-drilling equipment to be used in the construction of the Hoover dam. Six Companies, Inc., San Francisco, is the general contractor. Four tunnels, 57 ft. in diameter and about a mile long, will be driven through solid rock.



STRAIGHT or taper threads may be cut on two diameters. Both sets of chasers are arranged to collapse simultaneously.

▼▼▼

THE SILVER LINING

WHAT is industry's greatest cost reducer? If you had asked that question two years ago, you would have received a large variety of answers, all of which would have been wrong. Ask it today and you will get a nearly unanimous answer from industrial executives. They will say that it is a business depression. Nothing is more powerful than the urgings of Mother Necessity.

Tom M. Girdler gives point to this in his statement at the recent annual meeting of the Republic Steel Corpn., of which he is president and chairman. "We take less men to make a ton of steel than ever before in the history of our companies. We made about 30 cost records in March."

Necessity is forcing American industry to take a big upward step in manufacturing efficiency The rewards will come later, but inevitably, when these gains are translated into real prosperity. That is where the silver lining comes in. But it is not "free" silver. It will have been bought and paid for by the intelligent efforts of those who are now earning it.

❖ ❖ ❖

A LOT, BUT NOT ENOUGH

CONTRACTS for public and semi-public construction negotiated since the first of the year total somewhat over a billion dollars, according to Col. Arthur Woods. Assuming that practically all of this eventually finds its destination in wages—as it does through one channel or another—this sum is sufficient to keep half a million people busy for a year. This on the assumption that each $2000 spent in construction will provide annual employment for one man.

Of course all of this money will not go toward putting the unemployed back to work, since there will be a considerable transfer of those already at work on old jobs nearing completion to the new ones. At best, we cannot figure more than a reduction, in unemployment, of say 250,000 people through even such gigantic construction totals.

Boosting construction helps, but it will not solve the unemployment problem by any means. Our manufacturing industries are the nation's big employers of labor. We may be placing too much emphasis on widely advertised expedients and thereby neglecting to think correctly about fundamentals.

❖ ❖ ❖

SAME HERE, JOHN

FEDERATION of British Industries in memo to British Department of Commerce says that a 30 per cent reduction in production costs is one of the essentials to the reestablishment of British trade.

The industries of Uncle Sam need the same medicine as that prescribed for those of John Bull. And our medicine is already prepared in the form of recent improvements in all sorts of production machinery.

All we have to do is to persuade both sufferers to buy and take their medicine.

❖ ❖ ❖

SLIPPING SHIPPING

LLOYD'S Register of Shipping, covering returns for the quarter ending March 31st, shows that shipbuilding is now smaller than at any time during the past four years. During this last quarter the tonnage for the shipyards of Great Britain and Ireland has fallen 215,000 gross tons, Germany has lost 80,000 tons, and the United States is 1000 tons behind the preceding quarter. But France is building nearly 60,000 tons more than at the beginning of the year. The construction of motor vessels has declined faster than that of other types. The United States is now third in rank in ship tonnage production, Great Britain and Ireland coming first and France second.

One thing the shipbuilders have to be thankful for. The motor trucks cannot compete with them as they do with the railroads, and aircraft are not yet even in the competitive picture. The decline in shipbuilding is not due to the coming of a superior means of overseas transportation, but to the general recession in volume of world trade. It is a temporary and not a permanent setback.

❖ ❖ ❖

MORE PIPE LINES

IF pipe lines continue to spread across lots at the present rate, our farmers will have to be careful where they plow. Here are some more projects of that sort in this week's news:

An oil line from Lathrop, Texas, with branch connections from other fields, connecting with main Gulf line to Port Arthur, Tex. Cost, $800,000. Sponsored by Gulf Pipe Line Co., Pittsburgh.

A natural gas pipe line from New River, West Va., to Kentucky State Line; part of an $8,000,000 system for Columbia Gas and Electric Corpn., New York.

An oil line from Marcus Hook, Pa., to Cleveland. Work begins shortly in Portage and Mahoning Counties, Ohio. Entire project, by Sun Oil Co., Philadelphia, involves $5,000,000.

A refinery gas pipe line from Toledo, Ohio, to the plant of the Libby-Owens-Ford Glass Co., Rossford, Ohio. Cost, $1,000,000. Pure Oil Co. of Chicago sponsors it.

February Employment in Metal Working

Identical manufacturing establishments reported upon by the United States Bureau of Labor Statistics showed a gain in employment for February compared with January, and a considerably greater gain in the amount of weekly payroll. The latter item evidently means a smaller proportion of part-time work.

Iron and steel establishments, to the number of 199 and employing more than 225,000 people, showed a gain of 0.4 per cent in employees and a gain of 10.5 per cent in weekly payroll. Cast iron pipe plants, 42 in number, employing about 9000 men, showed a gain of 5.6 per cent in number of wage earners and 8 per cent in payroll total. More than 1000 foundry and machine shop units, employing almost 200,000 people, showed a gain of 0.5 per cent in number and of 4 per cent in payroll.

Structural iron work plants, hardware manufacturers, machine tool plants, and plants making steam fittings and steam and hot-water heating apparatus showed reductions in employment, but three of the four groups showed an increase in the payroll total. Each of these four groups employs between 22,000 and 27,000 men, with an average reduction of about 2 per cent in number on the payroll and, in the aggregate, about a stationary total in payroll payments.

Plants making stoves and employing more than 15,000 men show a gain of 13.8 per cent in number and 22.3 per cent in payroll total. Automobile plants, with 270,000 employees, showed 2.4 per cent increase in number of wage earners and 52.5 per cent in amount of payroll. Agricultural implement plants and shipyards, on the contrary, showed decreases averaging about 3 per cent in number on payroll, but considerably smaller decrease in the payroll total.

▲▲▲

Corporation's Unfilled Orders Up Again

Registering a gain of 30,136 tons in March, unfilled orders of the United States Steel Corpn. on March 31 are reported at 3,995,330 tons. This gain reverses the decline in February and resumes the upward movement under way from Sept. 30 last to Jan. 31.

Except for 1927, this is the only time the March 31 total has been under 4,000,000 tons since 1911. This is the third successive March increase, previous to which March had registered five successive declines. Of the 21 times March has been reported upon, nine have showed gains and 12 losses.

The current total is up 16.7 per cent from the recent low mark—that on Sept. 30 last. One year ago the total was 17.1 per cent above that on the Sept. 30 next preceding.

Unfilled tonnage at the end of each month for the past two years follows:

	1931	1930	1929
January	4,132,351	4,468,710	4,109,487
February	3,965,194	4,479,748	4,144,341
March	3,995,330	4,570,653	4,410,718
April	.....	4,354,220	4,427,763
May	.....	4,059,227	4,304,167
June	.....	3,968,064	4,256,910
July	.....	4,022,055	4,088,177
August	.....	3,580,204	3,658,211
September	.....	3,424,338	3,902,581
October	.....	3,481,763	4,086,562
November	.....	3,639,636	4,125,345
December	.....	3,943,596	4,417,193

Prices of Non-Ferrous Ingots in March

The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of six principal mixtures of ingot brass during the 28-day period ended March 27. These statistics will have to be gathered and reported on the basis of "commercial grades" until the revised specifications for copper base alloys in ingot form for sand castings, adopted as tentative specifications by the American Society for Testing Materials during the summer of 1930, are in sufficiently general use to enable the gathering of statistics on a strict specification basis.

	Cents
Commercial 80-10-10 (1 per cent impurities)	10.838
Commercial 78 per cent metal....	9.043
Commercial 81 per cent metal....	9.487
Commercial 83 per cent metal....	9.621
Commercial 85-5-5-5	9.957
Commercial No. 1 yellow brass ingot	7.880

▲▲▲

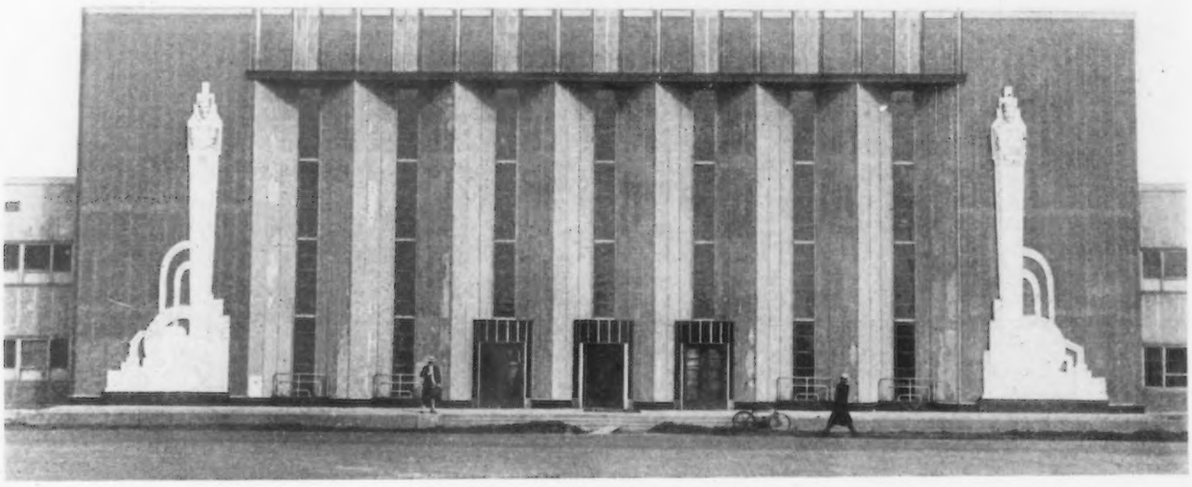
Three New Special Cast Steels Introduced

The Los Angeles Steel Casting Co., Ltd., Los Angeles, Cal., manufacturer of "Nikeladium," an alloy cast steel, recently announced the introduction of three new steels as "partners" of Nikeladium. The three new steels are known as A1 20, A1 30 and A1 40, and are specially designed to present various combinations of strength and toughness that can be made to fit special conditions of service.

▲▲▲

CHICAGO PREPARES FOR WORLD'S FAIR

BUILDINGS for the World's Fair to be held in Chicago in 1933 are being erected as rapidly as contracts can be awarded. Among those now under construction are the Administration, Travel and Transport buildings. The illustration shows the entrance to the Administration Building.



Welding Society Arranges Annual Meeting

Discussion of welding as applied to shipbuilding, structural steel work and piping, as well as technical problems relating to the various forms of welding, has been arranged for the annual meeting of the American Welding Society, to be held at 33 West Thirty-ninth Street, New York, April 22-24.

The shipbuilding session in the morning of April 22 will include the following papers: "Welded Boilers for United States Navy Scout Cruisers," by J. C. Hodge, Babcock & Wilcox Co.; and "Welded Machinery Foundations for Ships," by G. H. Moore, Jr., Newport News Shipbuilding & Dry Dock Co. Some examples of welding in structural steel work will be described by D. C. Tennant, Dominion Bridge Co., at the afternoon session. Following this, Odd Albert, bridge designer, New Jersey Highway Commission, will discuss formulas for eccentrically welded joints, and H. H. Moss, Linde Air Products Co., will describe tests made on gas-welded structural joints.

Various technical problems of welding will be considered during the morning session April 23. Papers scheduled for this part of the program are: "Some Resistance Welding Problems," by C. L. Pfeiffer, Western Electric Co.; "Strength and Characteristics of Various Types of Connections for Static and Dynamic Loadings," by C. H. Jennings, Westinghouse Electric & Mfg. Co.; and "Fusion Welding as Applied to High-Pressure Heat Exchangers," by Marselis Powell, Whitlock Coil Pipe Co.

A joint meeting with the piping code committee of the American Standards Association is planned for Tuesday afternoon. Consideration will be given to the proposed section of the code dealing with the welding of pressure piping. At the same session J. H. Zink, Heating and Piping Contractors Association, will address the meeting on Pipe Welding in Industrial and Heating Installations. A dinner and entertainment is scheduled for the evening of April 23.

Papers scheduled for the final sessions, April 24, include: "Thermit Welding in Maintenance in the Steel Mill," by J. H. Deppeler, Metal & Thermit Corpn.; "Metal Arc Welding of Copper Alloys," by Ira T. Hook, American Brass Co.; and "High Tensile Atomic Hydrogen Arc Welds in Alloy Steels," by Frederick Ray, Croll-Reynolds Engineering Co. Joint meetings of the structural steel welding committee and the American Bureau of Welding will be held on the afternoon of April 24, preceding the annual meeting of the American Bureau of Welding.

An inspection trip to the New York Hospital and Cornell Medical Center, a project involving over 50,000 ft. of welded piping, for transmission of hot water, brine and steam for low and high pressure service, is planned for Saturday, April 25.

Open-Hearth Operators to Meet in Chicago

A meeting of open-hearth operating men, under the chairmanship of Leo F. Reinartz, will be held in Chicago at the Hotel Stevens on May 12 and 13. This is the regular semi-annual meeting under the auspices of the American Institute of Mining and Metallurgical Engineers. The two-day program will include a visit to the South works of the Illinois Steel Co., where the recent large addition of open-hearth furnaces will be inspected.

According to present plans, this visit will be made on the afternoon of the first day, so that the morning session on the second day may be devoted in part to a discussion of the new plant and the equipment there observed.

▲▲▲

Continental Roll & Steel Foundry Co., which was formed by a merger of the Hubbard Steel Foundry Co., East Chicago, Ind.; the Duquesne Steel Foundry Co., Coraopolis, Pa., and the Wheeling Mold & Foundry Co., Wheeling, W. Va., has issued its first annual statement for the year ended Dec. 31, 1930. The company had a net profit of $751,265, which, after deduction of $210,000 for preferred stock dividends, left $541,265 for common stock, equal to $2.50 a share on the 216,000 shares outstanding.

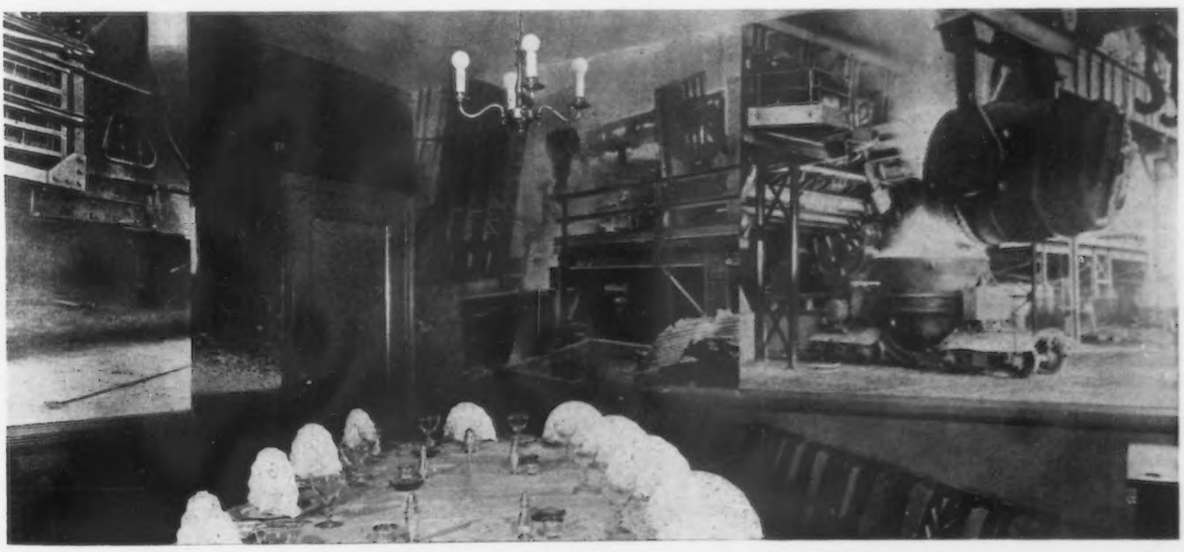
▲▲▲

STEEL MAKING A THEME FOR WALL DECORATION

PRIVATE dining rooms in the Cloud Club, which occupies the sixty-sixth, sixty-seventh and sixty-eighth floors of the Chrysler Building, New York, have been decorated by Myers, Minott & Co., 383 Madison Avenue, New York, with scenes from various industries, including steel, oil and aviation.

Large photographic murals, enlarged from ordinary photographs by the Eastman Kodak Co., Rochester, N. Y., have been applied to the walls, the use of certain industrial views for decoration having been suggested by the connection of groups of members with the steel, machinery, automotive, oil and other business fields.

Although the individual photographs are in most cases enlarged about 100 times from the original print, the largest section used being 40 x 72 in., the subject is clear and the prints are carefully matched and in the same perspective. The photograph of the "Steel" room shows the effect of using open-hearth furnace scenes as decorative features of walls.



Discusses Importance of Steel in Automobiles

The importance of the steel industry to the manufacture of automobiles was brought out in a talk by William B. Todd, general manager of sales, Jones & Laughlin Steel Corpn., Pittsburgh, before a joint meeting of the Pittsburgh chapter of the Society of Automotive Engineers and the Chamber of Commerce of Pittsburgh held in that city on April 9.

Mr. Todd pointed out that the automobile industry consumed approximately 18 per cent of the total rolled and finished steel produced in 1929, including 39 per cent of the sheets, 60 per cent of the strip steel and 29 per cent of the bars. The industry also took 59 per cent of the malleable iron castings produced in that year.

Enumerating some of the products manufactured in Pittsburgh for the automobile industry in which the use of steel predominates, Mr. Todd mentioned springs and bumpers, hardware and other accessories, screw machine products, bolts, nuts, rivets, tire chains and tools, forgings, castings and springs for seats.

H. V. Churchill, chief chemist, Aluminum Co. of America, New Kensington, Pa., discussed the rapid increases in the use of aluminum in the automobile industry, indicating that the saving in weight had been of particular advantage to makers of buses and trucks as well as of pleasure cars.

Electrical developments which have been of particular importance to automobile manufacture were discussed by S. M. Kintner, assistant vice-president, Westinghouse Electric & Mfg. Co., East Pittsburgh. Mr. Kintner dwelt particularly upon the application of the photo-electric tube to the various needs of the industry.

▲▲▲

Ore Imports in February Declined 55,000 Tons

Incoming iron ore in February is reported by the Department of Commerce at 94,529 gross tons, a drop of more than 55,000 tons from the January total of 149,686 tons and, with the exception of last November, the smallest monthly total since September, 1925, and the smallest February figure since 1922.

Compared with January, heavy losses occurred in shipments from Spain, from Chile and from the miscellaneous group. About 7000 tons came in from Sweden, the first this year. Chile, as usual, furnished the largest proportion, with almost 70 per cent of the total.

In the two elapsed months the incoming total was less than half that of the corresponding period a year ago. Shipments from Cuba, which were heavy in 1930, have been cut off entirely, and the same is true of the smaller shipments from French Africa. Ore coming from Chile is only a little more than half that of the first two months of 1930, and this is true also of Swedish ore.

There was an increase of about 25 per cent in Spanish ore imports, while the tonnage from miscellaneous countries showed a considerable increase, most of that movement having been in ore from Russia.

Sources of American Imports of Iron Ore

(In Gross Tons)

	February		Two Months Ended February	
	1931	1930	1931	1930
Canada	....	70	....	70
Cuba	....	31,100	....	80,000
Chile	64,466	150,218	176,180	337,332
Spain	7,870	7,960	19,597	15,600
Sweden	6,990	....	6,990	13,501
French Africa	....	6,100	....	36,620
Other countries	15,203(a)	7,852	41,448	12,852
Total	94,529	203,140	244,215	495,975

(a) Of this amount, 15,050 tons came from Russia.

▲▲▲

New Standards Adopted for Wrought Iron

Two new American tentative standards, specifications for refined wrought iron bars (G12-1931), and specifications for wrought iron plates (G13-1931), have been approved by the American Standards Association. These were submitted by the American Society for Testing Materials as sponsor.

Both specifications were originally approved by ASA in 1923 as American tentative standards. They have now been revised by the addition of a definition for wrought iron and the elimination of the reference to puddling. The definition of wrought iron reads:

"Wrought iron is a ferrous material, aggregated from a solidifying mass of pasty particles of highly refined metallic iron with which, without subsequent fusion, is incorporated a minutely and uniformly distributed quantity of slag."

Elimination of the reference to puddling affects the specifications concerning the manufacture of the products. The original specifications stipulated that the bars according to G12 and the piles according to G13 should be made from puddled iron. The revised specifications simply specify that the bars and piles shall be made from wrought iron.

Copies of the standards are available at 25c. from the American Standards Association, 29 West Thirty-ninth Street, New York.

▲▲▲

Low-Pressure Boilers Show Wide Diversity

In an attempt to eliminate the waste prevalent in the manufacture of low-pressure steel heating boilers, the division of simplified practice of the Bureau of Standards, at the request of the industry, has made an investigation into current practices. Twenty-one firms (representing over 90 per cent of the 1930 output) reported total shipments of 7805 boilers, of which over 76 per cent were of the welded combination type. Of the total shipments, 3036 boilers were to be mechanically fired.

Eighteen different kinds of boilers were reported, each made in from 6 to 132 different capacity ratings. The total variety aggregated 1072. Analysis of the two most popular kinds of boilers showed that over 84 per cent of the sales were made in 20 per cent of the capacities produced. No shipments were made in over 28 per cent of the capacities produced.

A detailed report of the survey is in the hands of the simplified practice committee of the industry. This is being used as a basis for the development of a simplified practice recommendation on the capacities of low-pressure steel heating boilers.

▲▲▲

Makes Rustless Steel Wire Rope

Wire rope of high chrome nickel alloy steel has been developed by the Hazard Wire Rope Co., Wilkes-Barre, Pa. It is claimed by the maker to be free from internal stress, flexible and suited to all wire rope operations. The strands and wires in the rope are preformed, being helically shaped to the exact form they assume in the rope structure. The rope is being supplied in practically all constructions and diameters for both standing and running ropes and also in 7 and 19 wire strands. The tensile strength of the rustless steel rope is said to be comparable with the best plow steel or improved plow steel. It is especially recommended by the manufacturer for use near chemicals or in acid fumes, or in temperatures up to 1650 deg. F.

Motor Car Sales Below Expectations; Makers Revising Output Estimates

DETROIT, April 13.

WITH April almost half gone, the automobile industry is beginning to revise some of its previous estimates of its 1931 performance. Even after making allowance for the subnormal state of business, retail sales have been somewhat below expectations, partially on account of unfavorable weather and partially because people hit by the depression have not yet had time to accumulate enough money to purchase automobiles. Probably less affected in recent months by industrial inactivity than other parts of the country, the Pacific Coast is now said to be feeling the full effects; consequently the motor car trade there is considerably less active than anticipated.

These unfavorable developments are leading the automobile industry to conclusions which it had hoped to escape—that manufacturers are going to end the first half of the year so far behind last year's record that even if they surpass the 1930 figures in every month in the third and fourth quarters, as they are likely to do, they will be doing well if they equal last year's production of three and a half million cars; and that possibilities of any 400,000-car months in 1931 are rapidly fading.

Although many men in the industry have privately had these thoughts in mind for some time, they have hesitated to express them. It remained for A. R. Erskine, president, Studebaker Corpn. of America, to give them public utterance the past week when he predicted that output this year would be 3,100,000 cars, exclusive of exports. In 1930 there were approximately 325,000 units shipped out of the United States and 154,192 cars manufactured in Canada. Mr. Erskine went one step further, for he put 1932 production at 4,000,000 cars, again excluding exports. This is a sharp paring down of the optimistic prognostications at the turn of the year that 1932 might see a new peak established.

After this revelation of the terms in which the industry is thinking, it would not be fair to leave the impression that there is only a dark side to the picture. Manufacturers are confident that by the middle of the year output will begin to contrast favorably with that in the same period of 1930, and this contrast will become increasingly noticeable in the final quarter when the industry will be turning out 1932 models to stock dealers. Moreover, April is shaping up with the biggest gain over March in five years, and May should at least sustain this month's pace.

▲ ▲ ▲

Automobile production in 1931 is now estimated at 3,500,000 cars, or the same as in 1930, in contrast with earlier predictions of 4,000,000 units.

* * *

National Automobile Chamber of Commerce places March output in United States and Dominion at 286,883 cars, an increase of 25 per cent over February. First quarter production was 695,050 units, or 34 per cent under the corresponding period in 1930.

* * *

Ford produced 99,035 cars in March, compared with 85,109 in February. Ford's output in first quarter was 239,326 units, against 400,700 in the like period last year.

* * *

Water movement of steel to Detroit this year is expected to set new tonnage record.

▼ ▼ ▼

Steel Specifications Show Mixed Trend

STEEL specifications from automobile companies are showing a somewhat mixed trend, with some mills reporting larger bookings than in March and others a falling off. Perhaps the most important retarding factor has been the failure of the Ford Motor Co. to attain the production goal which it had set for April. It is understood that this month probably will not show much, if any, increase over the 99,000 cars made in March. However, the company is guarding closely its operating rates and it may surprise the industry, as it did last month, with a considerably higher total than observers had predicted. Nevertheless, steel suppliers are feeling the lack of a pickup in Ford tonnage which they previously had counted on.

Originally scheduling 85,000 jobs for April, Chevrolet has stepped up assemblies and may top the 100,000 mark. This again focuses attention on the close race between Ford and Chevrolet for leadership. In December, January and February Chevrolet showed the highest number of passenger car registrations, and early March returns revealed no change in position. However, Ford truck sales have been sufficiently heavy to offset Chevrolet's advantage in passenger cars, so that January was the only month in which Chevrolet led in total registrations. On the other hand, Chevrolet has expanded its truck operations substantially in the past few months and is preparing to contest

vigorously Ford's supremacy in that field.

Chevrolet truck bodies now are built in the main truck body plant at Indianapolis, formerly the property of the Martin-Parry Corpn., and are shipped in sections to 52 branch plants for assembling and mounting. Chevrolet is now pricing its trucks as a complete unit, as on passenger cars, rather than listing the body separate from the chassis. By this means a national price is established on each type and Chevrolet assumes the servicing on bodies as well as on the chassis. The company is now making 19 truck models on three wheelbases.

Aside from Chevrolet, the most promising gains are being made by Chrysler Corpn., which has accelerated its April program, with 31,000 units as its goal. Of that amount Dodge will contribute the largest share of all subsidiaries. Incidentally, both Chevrolet and the Chrysler-owned companies are specifying steel at a good rate, and in some cases have moved up releases to conform with increased schedules. Studebaker likewise has made an upward revision for April, with 7500 cars as its objective.

Ford Earnings Declined Last Year

EARNINGS of the automobile industry have come into the foreground in the past week. In 1930 the Ford Motor Co. seems to have earned $44,460,823, according to the balance sheet filed in Massachusetts. This figure is arrived at by comparing the profit and loss surplus of $708,888,247 on Dec. 31, 1930, with the $664,427,424 of a year previous. These earnings are at the rate of about $29 a car, in view of the fact that Ford turned out 1,500,000 cars last year. It is interesting to point out that a considerable part of the profits is said to have accrued from savings in transportation charges due to the location of branch assembly plants at strategic points throughout the country. Profits are little more than half of those in 1929, which were $81,797,861. The highest annual earnings from available records were in 1922, when they attained a peak of $115,000,000. In the three months ended Feb. 28, the Auburn Automobile Co. and subsidiaries earned $1.06 on common stock, compared with 51c. in the corresponding quarter of the previous year.

Water Movement of Steel to Set Record

WATER movement of iron and steel to Detroit this season is expected to set a new tonnage record. The first shipment was from a Cleveland mill to the Ford Motor Co. and is to be followed shortly by a sizable lot of steel dispatched by boat from a Buffalo steel plant to this city. From Chicago the initial steel shipment was to have left the past week, but the Upper Lakes were not sufficiently cleared of ice to permit the trip. The Lake navigation season officially begins April 15 and a heavy premium is charged for cargo insurance prior to that date. One of the large steel makers, which late last season inaugurated a combination rail-water route from the Pittsburgh and Youngstown districts to Detroit, will make much more extensive use of this method this year. It is planning to ship by rail from Duquesne, Pa., and Youngstown to Conneaut, Ohio, and thence by Lake carrier to Detroit. A small boatload of steel scrap already has moved from this city to Buffalo and another boat, which has been tied up here all winter accumulating a cargo, will leave shortly. However, water transportation of old material to Buffalo and Cleveland this year is expected to be below normal on account of the plentiful supplies on hand in those cities.

Before the end of the month the first water shipment of pig iron will be made from Buffalo to the Chevrolet foundry at Saginaw, Mich. When the navigation season closed last fall Chevrolet had piled up about 65,000 to 70,000 tons to tide it over the winter, and it is said that this stock will be near exhaustion when the Buffalo cargo arrives. A small tonnage of silvery iron may go by boat from Chicago to Saginaw. Ford and Chevrolet have been the chief recipients of iron and steel by water, boats plying the Rouge River direct to the Ford plant and discharging the Chevrolet tonnage at the Nicholson dock, where it is transferred to railroad cars for delivery to the local gear and axle plants. However, other companies are constantly receiving more steel by water. Water movement has gained impetus as local iron and steel producing facilities have grown.

It is almost impossible to estimate the savings in transportation cost as compared with all-rail rates, as they vary according to the size of the cargo, individual agreements with shipping interests and numerous other qualifying factors. However, it is agreed that they generally total $2 to $3 a ton. It becomes increasingly evident that inland mills which cannot make even partial use of the water are at a growing disadvantage. For the moment they are said to be protected somewhat by the fact that automobile companies wish to retain them as a source of supply and consequently pay them a higher delivered price than the water-located plants. Nevertheless, observers point out that users will not always hold to this policy, especially when they are satisfied that a sufficient number of mills have water transportation facilities.

▲▲▲

Industrial Machinery Exports Decline

Foreign sales of industrial machinery, after a brief recovery in January, again continued the downward tendency which has had little interruption since July, 1930. Customs returns show the February total for shipments abroad of this class of goods at $12,620,700. This represented a drop below both January, 1931, and February, 1930, but still indicates substantial business.

▲▲▲

Making a gain of 45,326 metric tons, exports of iron and steel from France in February rose to 309,179 tons from 263,853 tons in January, according to a cablegram from the Paris office of the Bureau of Foreign and Domestic Commerce.

United States Exports of Industrial Machinery

Class of Machinery	1930 February	1931 January	1931 February
Power generating, except electric and autotive:			
Steam engines (a)	$366,466	$280,292	$191,604
Internal combustion engines (b)	725,660	417,767	492,744
Water wheels and water turbines	46,899	160,420	263,841
Total	*$1,139,025*	*$858,479*	*$948,189*
Construction and conveying machinery	$2,099,446	$994,522	$785,236
Mining and quarrying machinery	1,438,921	1,606,942	723,719
Well and refinery machinery	3,494,091	2,280,514	1,012,157
Pumping, power (c)	778,578	543,501	366,103
Total	*$7,811,036*	*$4,430,957*	*$2,887,215*
Metal-working machinery:			
Power driven	$2,942,011	$2,766,930	$3,678,661
Other	368,053	307,293	249,510
Total	*$3,310,064*	*$3,074,223*	*$3,928,171*
Textile machinery	$715,624	$558,104	$515,235
Sewing machines, industrial	425,866	234,050	193,936
Shoe machinery, except sewing	138,146	112,840	69,793
Total	*$1,279,636*	*$904,994*	*$778,964*
Other industrial machinery (d)	$6,176,279	$4,412,324	$4,078,251
Grand total	*$19,716,040*	*$13,675,499*	*$12,620,790*

(a) Excludes locomotives.
(b) Excludes engines not over 10 hp
(c) Excludes windmill pumps.
(d) Includes mine cars.

Republic Steel Corpn. Elects New Directors

At the annual meeting of stockholders of Republic Steel Corpn. on April 8, the following were elected directors: B. F. Fairless, R. J. Wysor, W. B. Collins and J. P. Moseley. C. F. Glore and Paul Llewellyn retired from the board of directors. All other directors whose terms had expired were reelected.

Tom M. Girdler, chairman of the company, made the following statement regarding business conditions and the affairs of the corporation:

"We sold more steel in December than in November. We made a better showing in our profit and loss account. January was better than December, February was better than January and March was better than February. March figures roughly show we are now running at about the same rate in reference to ingot capacity as other companies.

"We have made some very large economies. In February our increase in gross sales was almost identical with the change in our profit and loss account. For March our increase in gross sales was larger than February and a very large percentage of that affected our profit and loss account.

"I am not bold enough to prophesy about the future. The steel business in the last ten days has not been as good as in the preceding 30 days. Whether this is due to pessimism or to a seasonal let-up I do not know. We have maintained our basic wage scale. We have made permanent reductions in salaried officers and in other forces. We take less men to make a ton of steel than ever before in the history of the companies making up the Republic Steel Corpn. We made about 30 cost records in March.

"The uses of steel are growing very rapidly and I think we are in the lead in this respect.

"We started late in 1930 to manufacture electric weld pipe in a major way at a time when demand was very low. We have about 5000 miles of electric weld pipe in service around the country. There have been no rejections of this pipe."

▲▲▲

World Shipbuilding at Low for Four Years

With a decline of over 325,000 gross tons since the beginning of this year, the volume of the world's merchant shipbuilding is now smaller than at any time in the past four years, says a statement just issued by Lloyd's Register of Shipping, covering returns for the quarter ended March 31, last, from all maritime countries except Russia, for which no figures are available.

Two-thirds of the decline in the past three months is accounted for by the falling off of the work in the hands of the shipbuilders of Great Britain and Ireland. The total tonnage being built in those countries now is 215,000 gross tons less than at the beginning of this year. In Germany there has also been a marked decrease, amounting to over 80,000 gross tons, and Holland and Japan report sizable declines also.

For the United States, however, Lloyd's Register points out there has been a decrease of only about 1000 tons, while France is building nearly 60,000 tons more than at the beginning of this year.

▲▲▲

Cleveland Metal Trades Branch Elects Officers

The Cleveland branch of the National Metal Trades Association at its recent annual meeting reelected its old officers. These are: President, George E. Randles, president, Foote-Burt Co.; vice-president, E. J. Stahl, vice-president, Baker-Raulang Co.; treasurer, W. C. Sayle, vice-president, Cleveland Punch & Shear Works Co. R. G. A. Phillips, vice-president, American Multigraph Co., was elected as a new member of the executive committee. Other members of that committee are the officers and P. A. Geier, chairman of the board of P. A. Geier Co.; Logan Monroe, assistant treasurer, Eaton Axle & Spring Co., and J. D. Cox, Jr., president, Cleveland Twist Drill Co.

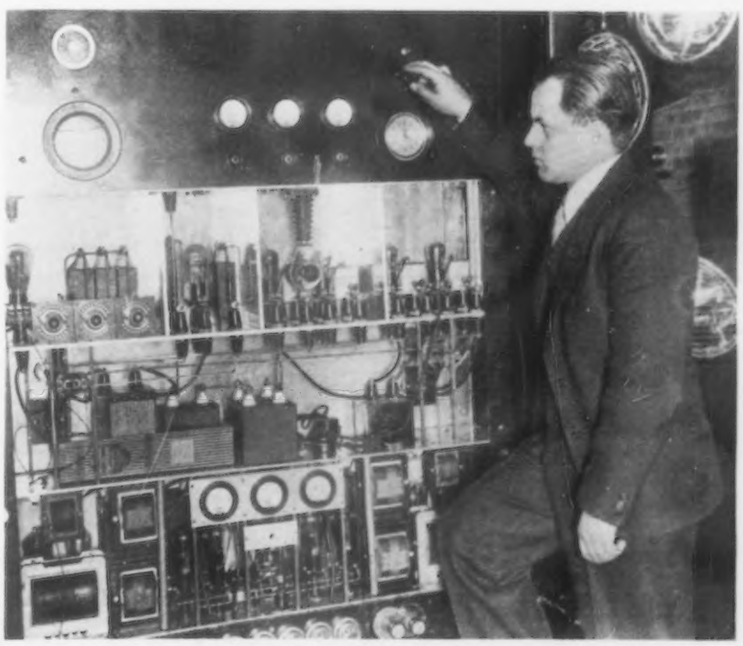
▲▲▲

Cleveland-Cliffs Had Profit of $4,886,150

The Cleveland-Cliffs Iron Co. reports a net profit of $4,886,150 during 1930, compared with $6,046,105 during the previous year. The Cliffs Corpn., allied holding company, reports a net profit of $2,558,233, compared with $1,767,470 in seven months of 1929. The Cliffs Iron report covers the acquisition of the majority interest of the Corrigan, McKinney Steel Co. and also an interest in Oglebay, Norton & Co. The balance sheet shows current assets of $13,999,746 and current liabilities of $4,254,433. Balance sheets of the Cliffs Corpn. show assets of $82,072,109, compared with $81,210,211 in the previous year.

TELEVISION TAKES ANOTHER FORWARD STEP

ALTHOUGH television is still a problem for the experimenters, definite progress is being made toward its realization on a practical commercial basis. U. A. Sanabria, a Chicago experimenter, is here shown with apparatus which permits reproduction on a 10-ft. screen so that a large group can see the pictures. This is the largest television screen yet to be developed.



Better Weekly Earnings in Factories

Average weekly earnings in representative factories in New York State are reported for February by the State Industrial Commissioner at $27.44. This is an increase of 43c., or 1.6 per cent, over the January average. With that exception, however, and the further exception of last November, the February average is the lowest for any month since August, 1924.

There has been for some years a fairly consistent increase in the average earnings, culminating in more than $30 a week throughout most of 1929. From the latter part of that year there was a fairly steady drop to the low figure of $27.01 last January.

▲▲▲

Educational Course of N. J. Steel Treaters

The New Jersey chapter of the American Society for Steel Treating has completed a course of eight lectures for the benefit of its members on heat treatment, metallography and uses of iron and steel. The course was designed to present the fundamentals of these subjects to the layman and were held on each Friday evening for a period of eight weeks from Jan. 16 to March 6. They were largely attended and were so successful that the chapter has formulated plans for further similar educational courses to be offered periodically. The educational committee consisted of E. L. Roff and E. S. Davenport. The subjects of the eight lectures and the speakers presenting them were as follows:

"The Manufacture of Iron and Steel from Ore to Ingot," by Dr. W. R. Frazer of the Eclipse Aviation Corpn., East Orange, N. J., on Jan. 16.

"Mechanical Working of the Ingot to Finished Shapes," by H. S. Wolfe, Alan Wood Steel Co., Conshohocken, Pa., on Jan. 23.

"The Metallurgical Microscope and the Microstructure of Iron and Steel," by J. R. Vilella of the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., on Jan. 30.

"Heat Treatment of Steel," by J. R. Morris of Republic Steel Corpn., Massillon, Ohio, on Feb. 6.

"Physical Testing," by Dr. K. Heindlhofer of the United States Steel Corpn. Research Laboratory, Kearny, N. J., on Feb. 13.

"Alloy Steels," by Dr. A. B. Kinzel of the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., on Feb. 20.

"Furnaces and Pyrometry," by H. Heyn, Surface Combustion Co., Toledo, Ohio, on Feb. 27.

"Cast Iron — Its Metallurgy and Uses," by F. B. Coyle, International Nickel Co., New York City, on March 6.

The average attendance at each lecture was 80 students.

▲▲▲

New Export Handbook

The "International Traders' Handbook," a volume which translates foreign weights, measures, currency, company names and trade terms, has been published by the Philadelphia Commercial Museum. It includes a gazetteer, giving principal cities and ports of the world, population statistics, the languages used by various nations in commercial transactions, and the approximate mailing time from each country.

New York Steel Treaters' Smoker on April 28

At the April meeting of the New York chapter of the American Society for Steel Treating, to be held on Thursday evening, April 23, instead of the usual monthly meeting date, Frank R. Palmer, assistant to the president, Carpenter Steel Co., Reading, Pa., will deliver an address on "Tool Steels."

The annual smoker of the chapter is scheduled for Tuesday evening, April 28, at the Hotel New Yorker, Eighth Avenue and Thirty-fourth Street. An elaborate vaudeville entertainment will follow the dinner, which is scheduled for 6.30 p.m.

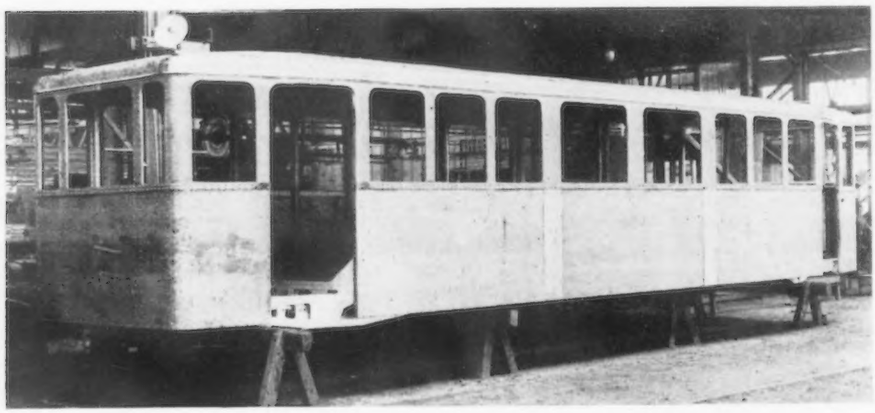
▲▲▲

Trackwork Shipments Gained in March

Production of trackwork for T-rail track in March is reported by the American Iron and Steel Institute at 8944 net tons. This is the largest monthly tonnage since that for last June and represents a gain of more than 40 per cent on the February total of 6321 tons. With the exception of the past nine months, however, this is the smallest monthly total since November, 1928, and with that further exception the smallest in a half-dozen years.

For the first quarter, shipments aggregated 20,891 tons, compared with 37,450 tons in the first quarter of 1930 and with 14,578 tons in the last quarter of 1930. Except for that last quarter of 1930 the first quarter's total was the smallest for any quarter in several years.

▲▲▲



▲▲▲

GERMANS USE ALUMINUM ALLOY CARS

THIS aluminum alloy railroad car being built by the Waggonfabrik A. G., Uerdingen, Germany, is claimed to provide a 50 per cent saving in weight compared with wood construction and has been found particularly desirable for mountain transportation. The body and chassis are aluminum alloyed with copper and zinc, and the wheels, axles and springs are of steel. Driven by 75-hp. or 90-hp. Diesel engines, these cars, a number of which have been ordered by the German Railway Administration, carry 55 to 70 passengers and are said to operate at 20 to 30 per cent lower cost in ordinary service and at 40 per cent saving in mountain transport.

Bethlehem Stockholders Ratify Bonus Plan at Annual Meeting

Action Not Binding, However, Pending Court Decision in Suit—72 Per Cent in Favor

STOCKHOLDERS of the Bethlehem Steel Corpn., representing 72 per cent of the outstanding stock, at their annual meeting in Newark, N. J., on Tuesday, ratified the corporation's bonus plan, but the vote was not binding because of a court decision handed down a few hours before the meeting restraining corporate action on the bonus, pending a decision in a minority stockholders' suit. The court did not forbid the vote, but it will have no legal effect.

The annual meeting attracted such a large crowd that the directors' room of the Fidelity Union Trust Co., Newark, where it was scheduled to be held, was not large enough, and an adjournment was taken to the Robert Treat Hotel.

Early in the morning Vice-Chancellor Backes of New Jersey announced that he had signed an order restraining corporate action on the bonus resolution, although he had not forbidden a poll of the stockholders. The Bethlehem management announced that it held the proxies of 52,867 stockholders who own 72 per cent of the stock.

A minority group of stockholders recently started court action to compel return to the company of such part of $36,493,668 paid on bonuses to executives as the court might find to have been excessive and to restrain further payments of bonuses until the court has reached a decision. This case is now pending in Chancery Court in Newark. At a hearing a week ago, John R. Hardin of Bethlehem counsel said that the corporation would not think of making further payments pending the outcome of the suit.

Explanation of Injunction

In his opinion, the vice-chancellor wrote:

"When apprehension is stirred by threatened oppression, appeal to equity is the appropriate recourse. And upon the case as made, the court ought to and may with propriety interfere to prevent the perpetration of the colorable resolution as a shield or screen from responsibility for the charges laid in the bill.

"Whether the defendants will eventually be entitled to the benefit of the resolution and the advantages that may flow from it will be reserved until the case is unfolded at the final hearing. In the meantime there will be an injunction restraining corporate adoption of the resolution with permission to cast but not to announce or record the vote unless and until permission is given."

Bonus System Not Impugned

In reference to the bonus system, Vice-Chancellor Backes wrote:

"The bonus system is not impugned; the attack is upon its administration. The policy of stimulating effort, efficiency and accomplishment by extra compensation is as old as the company itself. The directors sanctioned the bonus and in 1917 the stockholders approved it and resolved that 3.43 per cent of the annual net earnings on a sliding scale upward, as the earnings increased, to 8 per cent be set aside for bonus to the executives and heads of departments as a group.

"The net annual earnings were to be found after interest charges and dividends on preferred stock, but before allowances for depreciation. The following year the stockholders authorized the directors to allocate the bonus among the officials, or delegate the function to its chairman or committee and empowered the board to change or modify the system but not to increase the bonus beyond 8 per cent."

"Since then," the opinion continues, "the allocation has been made by the chairman among the group of officials upon a sustained ratio basis with one exception. The share of the chief executive (Eugene G. Grace) in one of the years (1929) was $1,623,753. The bill challenges these disbursements as grossly excessive and as an unconscionable enrichment of the executives at the expense of the stockholders.

"The complainants now move to enjoin the adoption of the resolution on the ground that if by this resolution the majority propose to bind the minority and thereby foreclose the complainants of relief, it can be done only after the body of stockholders are informed of the issues; that they are not informed and consequently there cannot be an intelligent vote on the question. If that be the legal effect of the resolution the objection is well taken."

Company Operating at 50 Per Cent

President Eugene G. Grace told stockholders that the corporation plants are operating at an average of 50 per cent of capacity and that the preferred stock dividend was earned in the first quarter "with a little balance for the common."

Charles M. Schwab read a prepared statement on the bonus question, repeating to some extent what he had recently stated in a communication to stockholders.

▲▲▲

Cleveland Company Gets Large German Contract

Contract for construction of a 2000-bbl. oil refinery in Germany, involving an expenditure of $1,000,000, has been placed with Arthur G. McKee & Co., Cleveland.

▲▲▲

Bucyrus-Erie Co. to Make Loadmaster Crane

Manufacture and sale of the Loadmaster, revolving boom crane, formerly marketed by Frederic H. Poor, Inc., New York, has been taken over by the Bucyrus-Erie Co., South Milwaukee, Wis.

This mobile crane has a boom swing of 360 deg., a rated capacity of 3500 lb., although much heavier loads can be handled under special conditions, and a maximum working reach of 14-16 ft. It may be mounted either on crawlers or on rubber-tired wheels, in the latter case having the maximum traveling speed of approximately 11 miles an hour. The machine can be used as a stationary revolving boom crane, as a crane traveling with its load, or as a tractor.

Foundry Congress in Paris in 1932

Paris, France, will be the scene of the fourth international foundrymen's congress which, by arrangement of the Association Technique de Fonderie de France, will be held Sept. 14 to 20, 1932. The sessions of the congress will take place at the Ecole Nationale d'Arts et Metiers, 151, Boulevard de l'Hospital, Paris. An international foundry exhibition will be held from Sept. 12 to 27 at the Parc des Expositions, Port of Versailles, Paris. Numerous visits to foundries and metallurgical works in the Paris district will be made, and a tour through the industrial region of France is planned.

▲▲▲

The Pittsburgh Foundrymen's Association will meet on April 20 at the Clifford B. Connelly Trade School, 1500 Bedford Avenue. Frank M. Leavitt, associate superintendent of the Pittsburgh Public Schools, will speak, and L. H. Turner, principal of the trade school, and F. W. Boland, director of trade training, will tell of the activities in the institution.

... PERSONALS ...

R. H. Clapp

R. H. CLAPP, who for more than 23 years has been affiliated with the wire manufacturing industry, has been appointed Eastern district sales manager of the Wickwire Spencer Steel Co., New York, and its subsidiary, the American Wire Fabrics Corpn. For a number of years Mr. Clapp was with the wire sales department of the American Steel & Wire Co., Boston. He has been with the Wickwire Spencer company since 1922.

❖ ❖ ❖

J. E. BRODERICK, formerly in the sales department of the Aetna-Standard Engineering Co., Youngstown, has become sales manager of Youngstown Steel Sales, a selling organization for the Fitzsimmons Co., manufacturer of cold-finished steel bars and allied products, Youngstown.

❖ ❖ ❖

HANS DAHLSTRAND, engineer-in-charge, steam turbine department, Allis-Chalmers Mfg. Co., Milwaukee, discussed "Problems in Steam Turbine Design" before the monthly dinner meeting of the Engineers' Society of Milwaukee on April 15.

❖ ❖ ❖

ALBERT E. GROVER, cost consultant, National Machine Tool Builders' Association, addressed the monthly meeting of the Milwaukee chapter, National Association of Cost Accountants, on April 8. Mr. Grover is a national director of the association and a former president of the Cleveland chapter.

DR. F. C. LANGENBERG, research director, United States Pipe & Foundry Co., Burlington, N. J., will be the principal speaker at the morning technical session of the group meeting of the New York, New Jersey and eastern Pennsylvania chapters of the American Society for Steel Treating in Philadelphia, May 15.

❖ ❖ ❖

H. G. CHANDLER, who has been active in branch organization work for the Oliver Farm Equipment Co., has been appointed manager of sales promotion work for the Havana Metal Wheel Co., Havana, Ill.

❖ ❖ ❖

GEORGE P. TORRENCE, vice-president in charge of the Indianapolis plant of the Link-Belt Co., Chicago, and RICHARD W. YERKES, secretary and treasurer, have been elected directors of the company.

❖ ❖ ❖

EDWIN T. HALL, for the past 15 years associated with the New England sales territory of the Sullivan Machinery Co., Chicago, has been made manager of that company's Boston office, succeeding the late George H. Richey.

❖ ❖ ❖

D. H. LOCKE, president, Locke Pattern Works, Detroit, a subsidiary of the American Radiator & Standard Sanitary Corpn., has been made vice-president and general manager of manufacturing, American Radiator Co., New York, to succeed A. E. GEDDES, resigned.

❖ ❖ ❖

B. N. GREENLAW has resigned as manager of the Bayonne, N. J., plant of the American Radiator Co.

❖ ❖ ❖

D. M. EDDY, vice-president and district sales manager of the Hanna Furnace Corpn., Buffalo, has been elected president to succeed C. A. Collins, recently deceased. WILLIAM KERBER has been made district sales manager at Buffalo.

❖ ❖ ❖

FRANCIS BUCKINGHAM, who has been identified with the testing machine and equipment industry for the past 18 years, has become associated as sales engineer with the Baldwin-Southwark Corpn., Philadelphia.

❖ ❖ ❖

ALFRED F. HOWE, who retired five years ago as vice-president and general sales manager of the Borden Co., Warren, Ohio, has returned to the company as Western sales manager, with headquarters at 717 Calmar Avenue, Oakland, Cal.

Louis H. Krieger

LOUIS H. KRIEGER has been appointed manager of the warehouse and fabricating shop at New Orleans, recently purchased from the Lukens Steel Co. by the Jones & Laughlin Steel Corpn., Pittsburgh. Mr. Krieger is a native of Louisville, Ky., and attended Purdue University, from which he was graduated in 1913 with a civil engineering degree. He became identified with the Jones & Laughlin company at Chicago in 1919, following service in France with the engineering corps. Mr. Krieger has been assistant manager of the Chicago warehouse of the Jones & Laughlin company since 1926.

❖ ❖ ❖

RALPH EVINRUDE has been elected a member of the board of directors, Outboard Motors Corpn., Milwaukee. He is the son of OLE EVINRUDE, president of the company and the designer of the original outboard engine.

❖ ❖ ❖

J. L. HILTON has resigned as sales manager of the steel fabricating department of Dalzell Brothers Co., Youngstown, to engage in business for himself in Warren, Ohio. He was formerly in the sales department of the Commercial Shearing & Stamping Co., Youngstown.

❖ ❖ ❖

THOMAS A. WILSON, since 1926 vice-president in charge of the Pittsburgh office of Rogers Brown & Crocker Brothers, Inc., has become identified

with Kerchner Marshall & Co., 1645 Oliver Building, Pittsburgh, dealers in pig iron, alloys, coal, coke and sand. Mr. Wilson began his business career with Rogers Brown & Co., in its Pittsburgh office 25 years ago, and was made manager in that district in 1914. He continued in the same position when the company was merged with Crocker Brothers in 1925. The Pittsburgh office of Rogers Brown & Crocker Brothers has been closed.

❖ ❖ ❖

RICHMOND NICHOLAS, vice-president of Hickman, Williams & Co., at Chicago, resigned on April 1.

❖ ❖ ❖

BENNETT CHAPPLE, vice-president, American Rolling Mill Co., addressed the American Institute of Architects at its annual convention at San Antonio, Tex., on April 14. He was the speaker chosen to represent the Producers' Council at the meeting.

❖ ❖ ❖

W. C. SCHMELING has been made president and general manager of the newly organized Wisconsin Art Bronze & Iron Co., Milwaukee. For the past two years he has been manager of the Milwaukee plant of the General Bronze Corpn. FRED VAN KOOY is vice-president of the new company and A. R. STARK is secretary-treasurer.

❖ ❖ ❖

STANLEY W. STEDFAST has been made secretary of Stedfast & Roulston, Inc., Boston, machine tools, and has taken up his duties as assistant to the president. Mr. Stedfast was a member of the class of 1924 of Massachusetts Institute of Technology and a graduate of Norwich University.

❖ ❖ ❖

BENJAMIN SCHWARTZ, director general of the Institute of Scrap Iron and Steel, addressed the New England Purchasing Agents' Association in Boston on April 13.

❖ ❖ ❖

H. N. RUPPLE, general manager, Cleveland Automatic Machine Co., Cleveland, returned April 14 from a trip to Europe, where he spent some time visiting his company's sales offices.

❖ ❖ ❖

J. MORRIS IRELAND, manager of the Cleveland office of the Westinghouse Electric & Mfg. Co. for the past five years, has been appointed special representative of the company to look after electrification of steel mills in the Cleveland district. He has been succeeded as manager of the Cleveland office by F. G. HICKLING, who has been transportation manager for the Central district in Pittsburgh.

❖ ❖ ❖

J. D. ROBERSON, of the Dallas, Tex., office, American Cast Iron Pipe Co., Birmingham, has been transferred to the New York office at 117 Liberty Street, where he will assist E. W. HERRMANN, Eastern and export sales manager.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

JAMES B. BONNER, sales manager of the Philadelphia district for the Carnegie Steel Co., died at Misericordia Hospital, Philadelphia, on April 8, after a brief illness. He was born in that city on July 27, 1863. When

James B. Bonner

William E. Ganschow

Carnegie, Phipps & Co., Ltd., opened an office there, he became associated with the firm and continued with that company and its successor, the Carnegie Steel Co., as manager of sales. During the war Mr. Bonner was vice-chairman of the committee on steel distribution of the American Iron and Steel Institute.

❖ ❖ ❖

WILLIAM E. GANSCHOW, second vice-president, Gears & Forgings, Inc., and in charge of that company's Chicago branch, died suddenly on April 7, aged 55 years. Indentified with gear manufacturing for many years, Mr. Ganschow was widely known not only through business relationships but also by his activities in the American Gear Manufacturers' Association and other organizations. Until 1928, when his company merged with Gears & Forgings, Inc., he headed the William Ganschow Co., Chicago and Peoria, Ill., which, organized by his father some 53 years ago, was one of the oldest gear manufacturing companies in Chicago. He was one of the pioneer members of the A. G. M. A. and was on the first general standardization committee. From 1918 to 1922 he served on the executive committee of that association.

❖ ❖ ❖

EDWIN S. SLATERY, formerly president and general manager of the Muncie Foundry & Machine Co., Muncie, Ind., died in a hospital in that city at the age of 59 years.

❖ ❖ ❖

WILLIAM H. REHM, president of the Winslow Boiler & Engineering Co., Chicago, died on April 8. He had been in failing health for a year and had been confined to his bed for the past five weeks.

❖ ❖ ❖

HARRY B. KIRKLAND, managing editor of *Railway Purchases and Stores* and secretary of the Concrete Mixing & Conveying Co., died at his home in Evanston, Ill., on April 3.

❖ ❖ ❖

ANDREW OLIN, superintendent of the splice mill at Joliet Works, Illinois Steel Co., died April 1, aged 68 years. He was born at Lund, Sweden, and came to this country when he was 17 years old. He had been employed by the Illinois Steel Co. for 45 years and had been superintendent of the splice mill for 35 years.

❖ ❖ ❖

GEORGE C. STONE, who succeeded his father as head of the Clinton Foundry Co., Clinton, Mass., and who managed that business for many years, died of blood poisoning in that city on April 11, in his sixty-seventh year.

❖ ❖ ❖

DANIEL H. DEYOE, of the industrial engineering department of the General Electric Co., a director and member of the American Welding Society, and active for many years in electric arc-welding activities, died in Schenectady April 11, aged 55 years. Mr. Deyoe was graduated from Union College in 1898 and joined the General Electric organization in the same year.

❖ ❖ ❖

WILLIAM ALLEN HARRIS, who bought the Agawam foundry, Springfield, Mass., and reorganized the company under the firm name of the Springfield Foundry Co., of which he

was secretary and manager for about 10 years, died April 5 at his home in that city. Leaving the Springfield Foundry Co., Mr. Harris became foundry sales agent for the Pratt-Cady Co., Hartford, Conn. Later this company acquired an interest in the C. H. Baush Iron Works, Holyoke, Mass., moved the concern to Springfield and reorganized it as the Baush & Harris Machine Tool Co., of which Mr. Harris became president. He was born in Springfield, Sept. 15, 1857.

❖ ❖ ❖

W. S. ROBERTSON, who became associated with the Combustion Engineering Corpn., New York, in 1912, died of heart failure on March 31, at his home in Newark, N. J. Mr. Robertson was in his seventieth year and had been actively engaged in sales work as special sales representative for northern New Jersey and eastern Pennsylvania until the time of his death.

❖ ❖ ❖

JOHN BISHOP BENNETT, for a number of years business manager of the *Metal Worker* and of *Building Age*, and long identified with business paper publishing, died at St. Petersburg, Fla., April 9, aged 81 years.

❖ ❖ ❖

ARCHIBALD G. SMITH, general superintendent of the Neville Island furnace of the Davison Coke & Iron Co., Pittsburgh, died at his home in Warren, Ohio, on April 12, aged 63 years. He was born in Scotland and came to this country when a young man to engage in the steel industry. Before going with the Davison company he was identified with the former Columbia Steel Co., Butler, Pa., the former Trumbull Steel Co., Warren, Ohio, and the Allegheny Steel Co., Brackenridge, Pa.

▲ ▲ ▲

Orders booked by Allis Chalmers Mfg. Co. in February were 33 per cent larger than in January, and March showed a 26 per cent increase over the previous month. Unfilled orders on March 31 amounted to $11,507,000, against $11,599,000 at the end of February and $12,086,000 on Jan. 31. Recent orders include one of $400,000 for a steam turbine and generator for Pasadena, Cal., and one of $625,000 for power and electrical equipment for the Inland Steel Co.

▲ ▲ ▲

Seattle Steel Co., 1200 Fourth Avenue South, Seattle, Wash., has been organized to engage in warehouse distribution of plates, shapes, bars and sheets. William Piggott, Jr., president of the new company, was formerly connected with the Pacific Coast Steel Co., and Charles W. Summerville, who is secretary and sales manager, was until recently purchasing agent of the Wallace Bridge & Structural Steel Co.

New Jersey Chapter of Scrap Institute Elects

James J. Brady, Federal Iron & Metal Co., Newark, N. J., was elected president of the New Jersey Chapter of the Institute of Scrap Iron and Steel, Inc., at its annual meeting held at the Progress Club in Newark, March 30. Barney Rubine, Hudson Iron & Metal Co., Bayonne, N. J., was elected chairman of the executive committee. Abraham Isaac, the retiring president, was elected as honorary president.

Other officers elected include the following: First vice-president, Frank Contey, Jr., Frank Contey, Inc., Jersey City; second vice-president, L. Lowenstein, Lowenstein Brothers, Newark; third vice-president, Julius Isaac, Hyman Isaacs & Sons, Elizabeth; secretary, Elliott S. Wilbur, Hamilton Iron & Metal Co., Paterson; treasurer, Frank Ganz, Mendel Samuel & Sons, Newark. The executive committee will consist of the above officers and the following: D. Gioscia, Gioscia & D'Amato, Jersey City; P. Bovasso, Bovasso Brothers, Jersey City; A. Reichman, M. Reichman Sons, Newark.

▲ ▲ ▲

Planning to Be Theme of Taylor Society Meeting

Planning of sales, production and labor relations comprise in part the topics selected for discussion at the spring meeting of the Taylor Society, which will be held at the Benjamin Franklin Hotel, Philadelphia, April 30-May 1.

The planning-of-sales session on the afternoon of April 30 will be followed by discussion of Planning on the Scale of an Industry.

Production planning, with Ralph E. Flanders, manager, Jones & Lamson Machine Co., Springfield, Vt., the principal speaker, followed by two illustrative cases, one relating to a medium-size organization and the other to planning in a very small organization, will feature the Friday morning, May 1, session. Simultaneous group meetings in the afternoon will be devoted to the following topics: Production routing at the plant of Proctor & Schwartz, Philadelphia; planning labor relations: further consideration of the Taylor Society Committee on an Industrial Employment Code; relation of cost accounting to budget making; and planning work in the office, illustrated by inspection of procedures at the Curtis Publishing Co.

National and international planning will be discussed at the dinner meeting on the evening of May 1. W. B. Donham, dean of the Graduate School of Business Administration, Harvard University, will speak on Is National Planning Necessary for American Industry? and Major L. Urwick, director, International Management Institute, Geneva, and C. H. van der Leeuw, president, International Industrial Relations Association, The Hague, will discuss international planning.

Thursday afternoon, April 30, members and guests of the society will be taken to Boxly, the Chestnut Hill home of Frederick W. Taylor, where they will be Mrs. Taylor's guests at tea.

▲ ▲ ▲

Steel Companies Exhibit in Store Windows

Steel producing and metal-working companies are well represented in an exhibit of raw materials and finished products arranged in the display windows of Gimbel Brothers department store, Philadelphia. In each window is the statement that "Millions of dollars lie idle in the banks of Pennsylvania. Unlocking this great buying power, setting the wheels of industry turning will speed up the return to prosperity."

Metals and metal products contribute largely to the exhibit, one of the larger displays being from the Crucible Steel Co. of America. Among the products shown by various companies are stainless steels, high-carbon tool and alloy steels, ferroalloys, bolts and nuts, aircraft parts of metal, forgings, taps, dies and reamers, metal-cutting tools, saws, automobile parts and pneumatic tools.

Among the exhibitors are the Baldwin Locomotive Works; I. P. Morris & De La Vergne, Inc., Philadelphia; Schramm, Inc., West Chester; American Equipment Co., Norristown; Milton Mfg. Co., Milton; Dallett Co., Philadelphia; W. Rose & Brothers, Sharon Hill; Bearings Co. of America, Lancaster; Pottstown Machine Co., Pottstown; Lycoming Mfg. Co., Williamsport; Summerill Tubing Co., Bridgeport; Baldt Anchor, Chain & Forge Co., Chester; General Steel Castings Corpn., Eddystone; Schuylkill Forge Co., Philadelphia; American Die & Tool Co., Reading, and the Electro-Metallurgical Co.

It is pointed out in connection with the exhibit that five mutual savings banks of Philadelphia reported savings deposits on April 1 of $466,596,541, the largest total in the history of the city.

▲ ▲ ▲

"Testing and Grading Foundry Sand" is the title of a new publication issued by the American Foundrymen's Association. It contains 151 pages and is well illustrated. It gives the standards and tentative standards adopted by the association which were recommended by the A. F. A. committee on molding sand research. The price of the publication is $3.

Price Adjustments Still in Order

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

AS shown in the chart, the average price of finished steel in March was approximately $47.82 a gross ton, compared with $47.98 in February, and $51.56 a year ago. Since the very slight recovery in January, the general effect is one of a gradual sagging as a result of the absence of good buying. This has been true in spite of strenuous efforts of sellers to maintain the market and some large forward orders for structural steel.

It is fairly clear that without the broad support of railroad, automobile and residential and commercial building activity, the steel price structure is not stable. Nor do we find much support in the general level of commodity prices. It is true that the Bradstreet index gained temporarily as of April 1 on account of advances in a few agricultural products.

But this ground was soon lost and at the present writing commodity price averages have reached new lows. The number of commodities showing declines has exceeded the number showing advances during several weeks. The so-called sensitive commodities present lower averages, including such items as cotton, gray goods, tallow, hides, silver, zinc and copper.

What Is Holding Prices Down

In general demand is dull, with little tendency toward forward buying, while supplies are ample, with stocks large in spite of curtailed production. And in the background we see the backwardness of automobile sales as an important factor, while widespread excess capacity results in a tendency to push production beyond the possibilities of profitable sales (as in silk and cotton textiles).

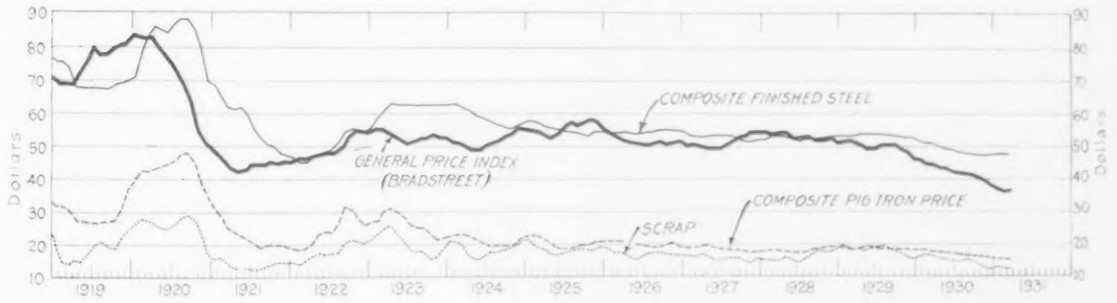
The level of finished steel prices compared with such a general index as Bradstreet's (4¼ times which equals $39.22) suggests that possibly the idea may still exist that general commodity prices are going to snap back and regain something like their former level. The same thought is suggested by efforts to maintain wage rates in spite of the downward trend of prices, earnings and dividends.

If the decline in prices since 1928 has been a mere cyclical dip, such as occurred in 1924 and in various cycles between 1900 and 1914, and is to be followed shortly by a recovery to former levels, one might defend the policies thus displayed. But is the evidence not all contrary to such an assumption?

In the first place, we note that the recession of 1929-1931 has been a second step in the deflation of war-price levels, and that prices are getting back to the adjustment which existed before the war. A good many basic commodities have fallen below prewar levels. Our experience following other great wars suggests this interpretation.

Wide Distribution for Higher Living Standards

In the second place, the expansion of production and productive capacity has greatly increased the supplies of commodities, both actual and potential. The increased output per man of which we hear so much is largely the result of mechanization and mass production, to say nothing of new processes and new sources of raw materials. The increased supplies may be used and may help to establish higher standards of living. But if the normal circulation of commodities is to be restored, it seems necessary that money prices should be readjusted on a lower level.



Spread between Bradstreet prices (adjusted) and finished steel remains at the greatest amount since 1924.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Taxing for the Unthrifty

EVERY dollar that is extracted from the taxpayer leaves him a dollar less to spend otherwise, Senator Borah would say to take it out of the larger incomes. Out of them it may not be felt keenly, and as for the corporation it is not supposed to have any feeling; but even the corporation is composed of stockholders, millions of them, and the more the taxation the less their dividend and consequently their deprivation of income and spending power.

The process boils down therefore to a transfer of income, a diminishing income, from one class of persons to another and as a generalization we may say from the thrifty to the unthrifty. This creates a diversion from the production of wealth to the enjoyment of consumption goods. It does not from this follow that there ought to be withholding of consumption goods. On the contrary, the creation of wealth, such as the building of houses, makes for work and so leads to ability to get consumption goods in exchange for work.

Let us have a real revival in building, for which the need and the opportunity exist, and there will be an increased demand for materials and for men to work in the mines and the mills. Soon thereafter we should hear no more about mass production, overproduction, etc.

Stock Market as an Indicator

IT is no new thing to assert that the stock market in the last two years or more has not accurately reflected the course of trade, nor is it entirely new to remark that the business public has not sufficiently taken the fact to heart, that it has not learned the reverse lesson, so to speak. Nevertheless the fact deserves iteration and reiteration, with the emphasis that comes from reciting the shocking details. The stock market used to be regarded as a barometer, something of prophetic character, as to the course of trade. Instead, it has been at times a slowly registering thermometer, various periods of time behind the trade course, and sometimes it has indulged in movements for which there was no preceding or subsequent business development as an explanation.

The stock market is supposed to represent values of property and business in connection with industrial activity and service to industries and their employees. The industrial stocks, the utilities and the railroads are all represented in industrial production, as measured by various authorities, including the very good work done by the Federal Reserve Board in presenting its monthly index of industrial production, manufacturing and mining. One is justified in setting the stock market record against the board's index, which adjusted for seasonal variation shows steadily rising activity through June, 1929, then 126 against 109 a year previous and an average of 100 for 1923-4-5. In July it lost two points, August and September each losing one point and October four points, putting October at 118.

What did this "barometric" stock market do? Instead of seeing a month ahead, it was 14 per cent higher in the first week of July than in the last week of May. Separately and combined stocks continued to advance, industrials, utilities and railroads all reaching their high points in the following September, the general average at the close of the first week of September being high for all time, at 13 per cent advance over the first week of July. Two months of receding industry witnessed this additional rise in the stock market.

The first big panic day was Monday, Oct. 28, after some lively times the preceding Saturday. Far from sensing its weakness, much less anticipating its impending collapse, the market of Friday had closed at an advance, and while 18 per cent under its high of 11 weeks earlier apparently thought it felt all right. It was then 5 per cent above its low of the preceding June, the peak month in business. Thereupon in 19 days it lost 32 per cent.

Early in 1930 both the stock market and industry made a false start. Which was cause and which was effect might be a subject of a little controversy. The Federal Reserve index high for the year, 107, appeared for both February and April, the intermediate month being at 104. The stock market high of the year came in April and certainly was not barometric of business.

Corresponding comparisons cannot be carried up to date as one must wait for business to show whether it is to bear out what the stock market may, perhaps, have been presaging of late. The market reached its high of the year, thus far, in the late days of February, when it was 17 per cent above last December's average. Last week it was 9 per cent below that high. Certainly with the showing the market has made for two years and more no significance, as to business movements, should attach to it now.

Taxpayers! Take Notice

ANOTHER distinguished Washington correspondent intimates that at the next session of Congress the veterans are going to demand at least a billion dollars more. The new Congress will sit immediately on the eve of a general and Presidential election. At such a time, consideration for ex-soldiers is likely to exceed consideration for taxpayers.

This cynical remark inspires the thought that the taxpayers might usefully form an organization with

commanderies, lodges and all the rest of the paraphernalia. If we are to be governed by politicians bowing to insistent associations, even though they be minorities, let the taxpayers themselves take a hand in the game. There are more of them than any other class. A taxpayers' league with annual dues of a dime per member could maintain an organization that would have every member of Congress cringing under the axe that it could swing. What the taxpayers need is conclaves, countersigns, badges and the rest of the trappings, with parades on the Fourth of July, etc.

▲▲▲

Less Coal but More Fuel and Work

JUST before the war the United States was consuming three-eighths of the world's coal; last year it consumed barely one-third. And thereby hangs a tale, for there is no doubt that the work done in the United States has increased much more than the work done in the rest of the world.

A review is in order, as the preliminary report of world coal production in 1930 has just been issued. It shows a total of 1,410,000,000 metric tons of anthracite, bituminous and lignite, of which the United States produced 34.2 per cent. Exports minus a small tonnage of imports represented 1.2 per cent, whereby our coal consumption last year was 33 per cent of the world's supply. In each of the years 1912, 1913 and 1914, our actual production was about 38.7 per cent of world output and exports reduced our proportion of world consumption to approximately 37.5 per cent.

Great changes have occurred since then. Our petroleum production has quadrupled and the increase in natural gas output has been approximately the same, there having been a tripling since 1915, the earliest year of the statistics. For a few years there may have been little increase in economy in the use of fuel, but in the last ten years there have been great economies.

Our coal production has been so erratic year by year that close comparisons are difficult. The record high year of all time was 1918, but the Armistice found us with large stocks. The recent course of affairs is of more interest and closer comparison can be made. Production in 1923 was fairly in keeping with the needs of the time, although it was swelled a trifle by there having been a great strike the year before, which exhausted stocks. The year was third best in our history, exceeded slightly by 1920 and greatly by 1918, and totaling 657,903,671 net tons. In 1923 petroleum and natural gas, computed on a heat unit basis, represented about 30 per cent addition to the fuel supply. Last year, however, the heat units in petroleum and natural gas represented an addition of more than one-half. In other words, in 1923 more than three-fourths of the total heat units was in coal, while last year less than two-thirds was in coal. While precise comparisons can be made on a heat unit basis, the precision would not be to the point, since coal, petroleum and natural gas are consumed differently.

Year by year, except for the depression, we have been doing more and more work relative to the rest of the world, but our proportion of coal consumption has gone down. There has been a decrease in coal exports, of little significance as the exports never were large. There has been much assistance from petroleum and natural gas, and there have been great economies in the use of fuel, the end of which is not yet.

Next to the United States as a coal producer comes Germany. With a world production last year of 1,410,000,000 metric tons, the United States produced 34.2 per cent, while Germany furnished 20.4 per cent. Great Britain was a close third, with 17.5 per cent. The other producers were numerous and relatively small individually.

▲▲▲

The New Welland Canal

THE largest freighters on the Great Lakes this season will be able to pass to and from Lake Ontario with the completion of the new Welland Ship Canal, which will take the place of the old Welland Canal. The latter has served more than 100 years as a navigable waterway connecting Lake Erie and the upper lakes with Lake Ontario. Traffic through the old canal has gained quite steadily, having doubled in the past ten years. The amount of freight in net tons carried through the canal last year exceeded 6,000,000 tons, although in 1927 and 1928 it passed the 7,000,000 ton mark. The increase is expected to be more rapid with the completion of the new canal.

While a few larger boats than could navigate the old canal went through the new channel last year, its completion that will allow boats of the largest size and deepest draft to pass through is scheduled for July 1. The old canal was restricted to boats of about 256 ft. length.

The steel industry in the United States will be helped to some extent by the opening of the enlarged canal but the benefits of the new waterway will be restricted. It will not be possible to use it for boats of deeper draft than used at present for carrying steel to Montreal and other St. Lawrence River ports, which receive most of the steel shipped by water from the Great Lakes to Canadian ports. The reason is navigation of the upper St. Lawrence River is restricted to boats of 14 ft. draft. Should the long advocated deeper channel project for the St. Lawrence River eventually be carried out, the usefulness of the new Welland Canal doubtless would be materially increased.

The draft of channels connecting the upper lake ports with Lake Erie is now 20 ft., which for the present will be the navigable depth for the new Welland Canal, although the minimum draft of the latter will be 25 ft. on completion of the dredging.

Enlargement of the Welland Canal will be of advantage to American vessel owners and shippers because it will make possible a more rapid movement of boats between Lake Erie and Lake Ontario. In the past congestion at the Welland locks has at times caused considerable delay. Steel companies will be able to use larger boats for carrying skelp, considerable of which goes from a Lake Erie port to Welland

for a Canadian pipe mill and also for shipping finished steel to Toronto and Hamilton, although not much American steel goes to those ports. It also will be possible to use the largest lake freighters for shipping ore from Lake Superior district to Hamilton. Much of the ore for Hamilton consumption in the past has been shipped by water to Sarnia, Ont., and from there by rail to its destination.

▲▲▲

More About Russia

THE Soviet Government issues a monthly book of photographs showing the industrial plants that it is building. The last number depicts among other things the copper and zinc metallurgical plants that are in process of construction. These have every appearance of major American plants. American engineers are building them. No one can fail to be impressed with the grandeur of the conception of the Five-Year Plan.

Let us consider, however, the manner of its execution. According to Soviet official reports the aggregate of Russian income in 1930 was about 36 billion rubles. The ruble is nominally worth about 50 cents, but externally it is now quoted at about 20 cents. The population of Russia is about 160 million. Unofficially it has been estimated that about one-half of the national income is diverted to new plant, which means that the people have only about one-half for consumers' goods.

Comparing with the United States, we had an income in 1929 of about 83 billion (population about 121 million) out of which we set aside probably not more than eight billion.

In a rough way this measures the difference between the present scales of living of the Russian and the American. In bringing out this thought we are neither deprecatory on the one hand nor boastful on the other. We try merely to get a sense of proportion. In doing that we derive the idea that the purpose of the new plants in Russia is to provide the Russians with the goods that they need in order to live better, rather than to flood the rest of the world with competitive products, in which there would be no sense anyway. The great questions are whether the Russian people can stand the strain of so much construction and whether when they get their new plant they will be able to manage it efficiently; in other words, whether they are sufficiently industrially minded.

▲▲▲

CORRESPONDENCE

Distribution of Profits

To the Editor: After reading your editorial "Production Begets Consumption" of March 26, I wonder if it is impossible for any of us to realize for what unwise distribution of profits is responsible—too much to capital, the greater proportion of which is available only for investments or, at best, for further expansion of excessive productive capacity (idle floor space and excess equipment, tools, and so forth).

A much larger proportion of excess gains should flow back naturally and wisely for use as consumer purchasing media, to those whose wants have been so eloquently appealed to.

Our production engineers have supplied capacity; research engineers, new products; sales engineers, new appeals; finance engineers, easy payments. Now we need economic engineers to remove the dam which allows too much media to drift back to investment and productive channels which serves only to enhance temporarily these investment values.

The channel for media to flow back for consumer demand use must be widened, so that investment values may be permanently enhanced. This is neither philanthropic nor "Red" but decidedly utilitarian.

C. C. LIMBOCKER,
President, Wolverine Tube Co.

Detroit.

▲▲▲

CAST BRONZE IN ARTISTIC USE FOR CLOCK

USE of metals for exterior decoration of buildings has become an accepted feature of construction today. This two-ton cast bronze clock is the central figure on the façade of the American Savings Bank building, 115 West Forty-second Street, New York, recently remodeled by M. C. Tredennick & Sons, Inc., New York. The cast bronze dragons supporting the clock are attached to converging steel I-beams set into the wall of the building.

Price Reductions in Scrap and Flat Rolled Products Darken Outlook

GENERAL Declines in Old Material — Wide Strip Down $1 a Ton—Ingot Output Recedes to 51 Per Cent—Line Pipe Business Looms Large

A FURTHER decline in steel ingot production, additional price recessions in light flat-rolled products and widespread reductions in scrap quotations have given the iron and steel market a negative tone. Hopes for a recovery in activity to a level equaling or exceeding that of March are waning, although there is by no means general acceptance of the view that the industry is merely following the usual seasonal downtrend from its first half peak.

SEASONAL influences that control the course of steel demand in ordinary times are now overshadowed by cyclical forces. Such important outlets for steel as railroad car building and farm equipment manufacture have been largely shut off. Rail bookings are far below normal. The volume of automobile production, although still offering promise, defies prediction.

Construction, stimulated by public works programs, and line pipe projects loom up as the most likely sources of heavier demand in the immediate future. But it is impossible to forecast whether this prospective gain will bring a net increase in total steel output or whether it will be more than offset by losses in other directions. Aggregate steel production is at such a low level that variations in business that would pass unnoticed in normal times are immediately reflected in steel works operations. Even buyers' psychology is affecting current mill schedules. Recent weakness in sheet and strip prices has unquestionably caused an appreciable tightening up of shipping orders.

RAW steel output has declined at Pittsburgh, Youngstown, Cleveland, Chicago, Pueblo and in the Wheeling district. Production for the country at large has receded from 53 to 51 per cent of capacity.

Structural steel awards, at 55,000 tons, compare with 41,500 tons a week ago. The large amount of pending work has been augmented by inquiries for 22,500 tons. Demand for reinforcing bars is expanding and the road building program is contributing to culvert tonnage, which is substantially larger than a year ago.

LINE pipe projects soon to be placed include a number of large tonnages. The Shamrock Natural Gas Co. is financing a line to carry natural gas to Fort Worth, Tex., which will require 245 miles of 18-in. pipe, amounting to 45,000 tons. About 35,000 tons for the Sinclair interests, which has been dormant for some weeks, is approaching the contracting stage. The Texas Corpn. is inquiring for 60 miles of 8⅝ and 10¾-in. oil pipe, totaling 4500 tons. The Ohio Oil Co. is in the market for 100 miles of 10-in., 9000 tons, and the Sun Oil Co. is about to take action on 150 miles of pipe, requiring 14,000 tons. A projected line for the Montana Power Co. is active, and a second gas line from Amarillo, Tex., to Chicago is now being planned and will call for a total of 250,000 tons.

Standard pipe sales show a gain over last month in conformity with the upturn in general building operations. Exports of tubular products to Argentina and Peru are improving, reflecting more settled political conditions in those countries.

MOTOR car companies are still taking less steel than a month ago. Two large automobile makers have increased their specifications, but this gain has been offset by the reduced orders of another important manufacturer.

RAIL production at Chicago has declined, now ranging from 50 to 55 per cent of capacity. The Colorado rail mill has been shut down temporarily due to lack of releases against contracts. The United States Steel Products Co. is reported to have received an order for 8000 tons of rails from the Egyptian State Railways.

SCRAP prices have broken rather generally in virtually every market center except Chicago. THE IRON AGE composite price for heavy melting scrap has declined from $11.08 to $10.83 a net ton, the lowest level since 1915.

Wide hot-rolled strip is down $1 a ton to 1.50c. a lb., Pittsburgh. Fender stock has receded $2 a ton to 3.30c. a lb., Pittsburgh, while long ternes have given way a similar amount to 3.15c. for unassorted, 3.25c. for seconds and 3.35c. for primes. The unusually severe reductions in light flat-rolled products are illustrated by the course of prices of automobile body sheets. At 3.10c., Pittsburgh, this product is $20 a ton below its 1929 peak.

PITTSBURGH

Steel Operations Again Decline Slightly—Scrap Prices Off 50c. to $1 a Ton

▲▲▲

PITTSBURGH, April 14.—Notwithstanding slightly more activity in the market for line pipe and increased buying of barges and other river craft, the Pittsburgh district steel market lacks a definite trend. Releases for finished steel products during the last week have just about held their own, but operations in this and nearby territories have again declined, reflecting the falling off in orders which has been experienced in the last three weeks.

Raw steel production in the immediate Pittsburgh territory has declined slightly to about 48 per cent of capacity, with the larger interests reflecting limited retrenchment for the first time. The leading interest has blown out a steel works blast furnace, offsetting the addition of an active stack on the first day of the month. In the Wheeling district open-hearth operation has declined to 55 per cent, while curtailment at most of the raw steel units in the Valleys has brought ingot operations in that district to less than 45 per cent.

Finishing mill activity has been most adversely affected in strip steel, sheets, merchant bars and pipe. Tin plate production is holding at close to 85 per cent of capacity, and there have been limited increases in output of merchant wire products and wire mesh for road work. A leading maker of these commodities is running its steel mills at 66 per cent of theoretical full. Production of rails and track accessories is being maintained, but the releases of the smaller carriers are hesitant.

Despite the fact that line pipe production is declining, the prospect for the placing of additional tonnage in the next fortnight has improved. The Shamrock Natural Gas Co. is financing a line to carry natural gas to Fort Worth, Tex., which will require 245 miles of 18-in. pipe, amounting to 40,000 tons. If the project is carried out, the pipe probably will be furnished by a Pittsburgh maker. Other projects in the West and South have again become active, and, following a period of two months' uncertainty, the pipe business again resumes an important position as a possible sustainer of steel operations through the summer months. Miscellaneous buying of barges and river craft by private companies is augmenting orders for Government equipment placed earlier in the year with local builders. Specifications for reinforcing bars are slightly heavier, but still leave something to be desired for this season of the year.

Prices of finished steel products are largely unchanged, with the most pronounced weakness continuing in sheets. Lower prices which have been made rather freely recently have now been openly recognized by some independent producers, and competition for such business as there is is very keen. Little buying of the heavier products is reported, and prices are nominally unchanged.

The raw material market is featured by a general decline in scrap prices ranging from 50c. to $1 a ton on the various grades. Scarcely any consumer buying is reported, and dealers are seeking orders with little regard for prices. The pig iron market has been enlivened by a large sale of basic to a non-integrated steel company which developed a very low price for delivery by water.

Reflecting smaller finished steel orders, raw steel output again declines slightly.

* * *

Prospects of increasing business largely in line pipe and steel barges.

* * *

Leading interest blows out blast furnace, offsetting addition of one on April 1.

* * *

Finishing mill activities in sheets, strip steel, bars and pipe most affected.

* * *

Scrap prices break sharply, declines of 50c. to $1 a ton occurring on most grades.

▲▲▲

PIG IRON

A non-integrated steel company in the Pittsburgh district is reported to have placed a substantial tonnage of basic and Bessemer iron with a steel company on the Ohio River, which is able to ship by water. While the delivered price was not disclosed, the same buyer made a purchase some months ago at at least $2 under the then current market, and it is reasonable to believe that the recent sale was made at not more than $15, furnace, for the basic iron. While such a transaction could hardly be duplicated elsewhere in the district, the sale is illustrative of the willingness of steel companies to dispose of their surplus stocks of pig iron when desirable tonnages are sought. The market on foundry iron continues very dull, with little buying to test prices. The foundry grade, as well as malleable and Bessemer, is quoted at $17, Valley furnace, and $17.50, Pittsburgh district furnace. Shipments of some sellers this month are not up to March levels.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50 to $17.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Low phos., copper free	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$17.00 to $17.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

SEMI-FINISHED STEEL

Demand is very dull and no new buying has been reported recently. Shipments average about 35 per cent of normal, with non-integrated tin plate makers taking the largest percentage. No test for the $30, Pittsburgh, price on billets, slabs and sheet bars has been offered in recent weeks. Forging billets are holding at $36. New business in wire rods is being taken at $37, Pittsburgh, with shipments on contracts commanding $35.

RAILS AND TRACK ACCESSORIES

Production of both rails and accessories is largely unchanged, with mills operating at the rate prompted by first of the month specifications. No hold-ups in releases have been reported in this district, and shipments are averaging somewhat higher than they did in the corresponding March period. Prices on track accessories are fairly well maintained.

COLD-FINISHED STEEL BARS

With demand from the automobile industry still restricted, cold-finishing mills are not able to run at much more than 35 per cent of capacity. Miscellaneous demand is also quiet. Prices are well maintained at 2.10c., Pittsburgh, on small-lot orders being placed currently.

BOLTS, NUTS AND RIVETS

This market is now beginning to reflect the recent curtailment in steel mill operations, and makers are running at about 35 per cent of capacity.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Apr. 14, 1931	Apr. 7, 1931	Mar. 17, 1931	Apr. 15, 1930
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$17.76	$17.76	$17.76	$20.26
No. 2, Valley furnace	17.00	17.00	16.50	18.50
No. 2 Southern, Cin'ti	14.19	14.19	14.19	16.69
No. 2, Birmingham	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	19.50
Basic, del'd eastern Pa.	17.25	17.25	17.25	19.00
Basic, Valley furnace	16.50	16.50	16.50	18.50
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	20.76
Malleable, Chicago*	17.50	17.50	17.50	19.50
Malleable, Valley	17.00	17.00	17.00	19.00
L. S. charcoal, Chicago	25.04	25.04	27.04	27.04
Ferromanganese, seaboard	80.00	80.00	80.00	94.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	30.00	30.00	30.00	33.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	33.00
Slabs, Pittsburgh	30.00	30.00	30.00	33.00
Forging billets, Pittsburgh	36.00	36.00	36.00	38.00
Wire rods, Pittsburgh	35.00	35.00	35.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.65	1.65	1.60	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.65	1.65	1.65	1.80
Bars, Chicago	1.75	1.75	1.70	1.90
Bars, Cleveland	1.70	1.70	1.70	1.80
Bars, New York	1.98	1.98	1.98	2.14
Tank plates, Pittsburgh	1.65	1.65	1.65	1.80
Tank plates, Chicago	1.75	1.75	1.70	1.90
Tank plates, New York	1.93	1.93	1.93	2.02½
Structural shapes, Pittsburgh	1.65	1.65	1.65	1.80
Structural shapes, Chicago	1.75	1.75	1.70	1.90
Structural shapes, New York	1.90½	1.90½	1.90½	1.99½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.55	1.55	1.55	1.70
Cold-rolled strips, Pittsburgh	2.25	2.25	2.25	2.55

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Apr. 14, 1931	Apr. 7, 1931	Mar. 17, 1931	Apr. 15, 1930
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.25	2.25	2.35	2.55
Sheets, black, No. 24, Chicago dist. mill	2.35	2.35	2.45	2.65
Sheets, galv., No. 24, P'gh	2.85	2.85	2.90	3.30
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	3.00	3.40
Sheets, blue, No. 13, P'gh	2.05	2.05	2.05	2.25
Sheets, blue, No. 13, Chicago dist. mill	2.15	2.15	2.15	2.35
Wire nails, Pittsburgh	1.90	1.90	1.90	2.15
Wire nails, Chicago dist. mill	1.95	1.95	1.95	2.25
Plain wire, Pittsburgh	2.20	2.20	2.20	2.40
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.45
Barbed wire, galv., P'gh	2.55	2.55	2.55	2.95
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	3.00
Tin plate, 100 lb. box, P'gh	$5.00	$5.00	$5.00	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$12.25	$12.75	$12.75	$16.00
Heavy melting steel, Phila.	10.25	10.50	10.50	14.00
Heavy melting steel, Ch'go	10.00	10.00	10.00	13.00
Carwheels, Chicago	9.50	9.50	10.50	14.50
Carwheels, Philadelphia	12.50	13.00	13.50	15.00
No. 1 cast, Pittsburgh	12.25	12.50	12.50	14.50
No. 1 cast, Philadelphia	11.50	11.50	11.50	15.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	13.50
No. 1 RR. wrot., Phila.	11.00	12.00	12.00	15.00
No. 1 RR. wrot., Ch'go (net)	8.25	8.25	8.00	12.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.50	$2.50	$2.50	$2.60
Foundry coke, prompt	3.50	3.50	3.50	3.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	10.12½	10.12½	10.12½	14.12½
Electrolytic copper, refinery	9.75	9.50	9.75	13.75
Tin (Straits), New York	25.60	25.85	27.50	36.37½
Zinc, East St. Louis	4.80	3.95	4.00	4.90
Zinc, New York	4.45	4.30	4.35	5.25
Lead, St. Louis	4.25	4.25	4.25	5.40
Lead, New York	4.50	4.50	4.50	5.50
Antimony (Asiatic), N. Y.	6.90	7.00	7.25	8.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Discounts are being maintained in most competitive districts.

TUBULAR GOODS

Prospects for the placing of considerable line pipe business have improved in the last week, and several producers feel reasonably sure that some of this tonnage will be on their order books before the end of the month. The Montana Power Co. is apparently about ready to place considerable pipe in a number of different sizes, and the Ohio Oil Co. has an inquiry out for 100 miles of 10-in. material to be used in connection with this line. Line pipe activity in the Texas and Oklahoma region is in abeyance pending negotiations with the railroads. Several fair-sized inquiries in the East are still considered active, and, with the coming of open weather, pipe laying activity is picking up in all parts of the country. Prices on line pipe are very unsatisfactory, but several mills are reaching the end of their order books and desire for tonnage seems to be the principal factor in the placing of orders. Standard pipe business has improved very slightly, but with some companies the first half of April was no better than the corresponding March period. Oil country goods are quiet, and mechanical tubing is not holding up to March levels.

BARS, PLATES AND SHAPES

With specifications for reinforcing bars and structural steel reflecting limited seasonal improvement and considerable activity reported in the barge market, conditions in heavy hot-rolled products are fairly satisfactory. Plates continue dull and production is off somewhat, reflecting the lower requirements of pipe mills. Business in merchant bars also leaves something to be desired, and alloy steel bars are hardly as active as they were last month. As a result, bar mill operations have declined slightly in both Pittsburgh and the Valleys, while plates and shapes are just about holding their own. The feature of the barge market is the buying by private companies, as business this year had heretofore been confined largely to Government work. In the last week three orders for four barges each were placed with Pittsburgh yards, and a coal company is inquiring for 20 to 30 units. Practically all of the builders in this district have managed to accumulate small backlogs, and some of them have enough business to operate at a fair rate throughout the summer. Pittsburgh mills are taking some reinforcing bar contracts in the East, but business here is still rather dull. The same condition prevails in the structural market.

Prices are unchanged. With new buying very light, no opportunity to test the 1.70c., Pittsburgh, asking quotation has been offered. Nevertheless, this price has been paid for some carload business in the last week or two.

WIRE PRODUCTS

Merchant wire products are still in fair demand, although small orders for rush shipment predominate. Jobbers in the agricultural regions seem to be opening up somewhat, weather conditions having improved considerably. Manufacturers' wire is not active, but demand is holding fairly close to recent levels. The price is fairly well maintained at 2.30c., Pittsburgh, with some contract tonnage moving at 2.20c. Nails are quiet

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
April 14, 1931	2.128c. a Lb.	$15.79 a Gross Ton	$10.83 a Gross Ton
One week ago	2.128c.	15.79	11.08
One month ago	2.142c.	15.71	11.08
One year ago	2.264c.	17.75	14.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel		Pig Iron		Steel Scrap	
	High	Low	High	Low	High	Low
1931	2.142c., Jan. 13	2.121c., Jan. 6	$15.90, Jan. 6	$15.71, Feb. 17	$11.33, Jan. 6	$10.83, April 14
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

and, as most users were well covered before the end of the quarter at low prices, spot buying is very light.

SHEETS

Demand is very light. The unsatisfactory price situation is provoking additional caution on the part of buyers. Specifications from the automobile industry are still considerably under the average of a month ago, and general demand for sheets is dull. Shipments to electric refrigerator makers, culvert manufacturers and steel furniture producers are holding up fairly well. During the last week a few independent makers have come out openly with lower prices on several finishes of sheets, but the quotations merely represent a recognition of conditions which have prevailed for two or three weeks. Black sheets are unchanged at 2.25c., Pittsburgh, but galvanized have grown weaker, with 2.85c. generally representative of the market. Light plates and blue annealed sheets are quoted at 1.85c. and 2c., with the continuous mill product $3 less. Auto body sheets range from 3.10c. to 3.20c., with little buying to test either price. Steel furniture stock is not above 3.50c., and vitreous enameling material is weak at 3.70c.

TIN PLATE

Production is holding at 80 to 85 per cent of capacity, and is fully maintained by current specifications. Some of the independent companies are running at capacity.

STRIP STEEL

No further declines in releases are reported, but the market shows no improvement. Production of hot-rolled strip averages about 40 per cent of capacity, with cold-rolling units engaged at a much lower rate. Heavier releases from the automobile producers are expected in the next week or two if May schedules show the expected gains. General demand for strip steel is quiet, with individual orders very small. Companies producing corrosion resisting material are fairly well engaged in most departments.

COAL AND COKE

No change is reported in this market, with furnace coke weak at $2.50, Connellsville, and demand for the foundry grade about 30 per cent of normal. In the West Virginia fields preparations are being made for shipping coal to the Great Lakes, but the movement is expected to get under way later than usual. Demand for domestic coal has tapered off, and industrial and railroad requirements are very light.

OLD MATERIAL

Following pronounced weakness over the last two weeks, the scrap market has declined sharply, with practically all grades reduced from 50c. to $1 a ton. While small sales of No. 1 heavy melting steel and hydraulic compressed sheets have been made at $12.50 in the past week, most of the reductions have been largely nominal, and in many cases the prices quoted today could not be obtained from buyers. The weakness in the market has developed because of an almost complete lack of interest on the part of consumers and a decided desire on the part of sellers to get orders on their books.

One or two buyers are still willing to make offers for scrap, but generally at prices at least $1 a ton under the quoted market. As an example, bundled sheets were sold only recently at $11.25, while the highest price offered by consumers today is $10. On machine shop turnings, one mill recently bought at $8.50 and then reduced its offering figure to $7.50. In the last week sales were made at the latter level. The same thing is true in the case of blast furnace grades, which have been sold at $8 and offered for less. Specialties are decidedly weak, and, while dealers are trying to get $16, consumers feel that purchases can soon be made at at least $1 a ton less.

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Light plates, blue annealed (No. 10)	2.75c. to 3.00c.
Blue annealed sheets (No. 13),	2.90c. to 3.05c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.82c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb	$3.30
Wire, black, soft ann'l'd, base per 100 lb.	2.40
Wire, galv. soft, base per 100 lb.	2.85
Common wire nails, per keg	$2.10 to 2.15
Cement coated nails, per keg	2.15

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting steel	11.00 to 11.50
Scrap rails	12.00 to 12.50
Compressed sheet steel	12.00 to 12.50
Bundled sheets, sides and ends	10.50 to 11.00
Cast iron carwheels	13.00 to 13.50
Sheet bar crops, ordinary	13.00 to 13.50
Heavy breakable cast	9.00 to 9.50
No. 2 railroad wrought	12.00 to 12.50
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	15.50 to 16.00
Railr. coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phos. billet and bloom ends	17.50 to 18.00
Low phos. mill plates	14.00 to 15.00
Low phos. light grades	14.00 to 15.00
Low phos. sheet bar crops	15.50 to 16.00
Heavy steel axle turnings	10.00 to 10.50
Electric Furnace Grades:	
Low phos. punchings	15.00 to 15.50
Heavy steel axle turnings	10.00 to 10.50
Blast Furnace Grades:	
Short shoveling steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Rolling Mill Grades:	
Steel car axles	17.50 to 18.00
Cupola Grades:	
No. 1 cast	12.00 to 12.50
Rails 3 ft. and under	14.00 to 14.50

CHICAGO — Steel Demand Lacks Definite Trend—Some Encouraging Factors

CHICAGO, April 14.—There is no definite trend in this week's steel market, some factors being of an encouraging nature while others point to at least a momentary end of the upward climb of spring demand. This immediate district has lost at least one open-hearth furnace, while at St. Louis the Scullin interest has added three open-hearths to take care of increased bookings. The rail department of the Colorado Fuel & Iron Co. has been closed temporarily because of decline in releases, and Chicago rail mills are finding it more difficult to maintain rolling schedules. On the other hand, there have been several small orders for cars, and oil producers' needs, especially in a new Texas field, are bringing the storage tank business back to life. Reinforcing steel for road programs is moving faster, and small structural inquiries and awards show some improvement.

The scrap market is drifting, with rather definite signs of leaning more than ever to the weak side. Steel mills, having adjusted ingot output downward to a shade under 55 per cent of capacity, need less heavy melting steel. Accordingly, they not only have checked incoming scrap shipments but they are firm in declining offerings of new tonnages.

The pig iron market, though lacking a progressive spirit, is fairly steady, with current shipments showing moderate increase over the rate in the latter part of March.

One cargo of steel has left a Chicago mill for distribution to various points along the Great Lakes, and other boat loads are being arranged for. Sales of finished steel are in fair volume, considering the recent buying movement when price changes were announced. Specifications remain individually small and at close range.

▲ ▲ ▲

Mixed tendencies in steel demand show lack of definite trend.

* * *

Some encouraging factors offset by declines in orders from other sources.

* * *

Colorado rail mill temporarily shut down. Chicago rail mills maintaining schedules with difficulty.

* * *

Ingot operating rate for district not over 55 per cent.

* * *

Scrap market dull, with signs of further weakness.

▲ ▲ ▲

PIG IRON

Purchases of Northern iron remain in fair volume, though most users hesitate to make commitments until they have put orders on their books. Buying has been of this character for the past six weeks. There was not what could be called a buying movement near the opening of the second quarter, but purchases have been rather consistent and furnace backlogs have been slowly growing larger. April shipments continue to show a small gain over the rate in March. Of special interest is the fact that the melt of malleable iron is growing, this quite evidently being a reflection of the activity of automobile manufacturers. From reports that a Milwaukee melter has placed an order for boat iron it develops that this will not be a new consignment from Lake Erie, but will be filled from the 4000 tons held over on Chicago docks from last season's movement. It is said that the carryover on Milwaukee docks amounts now to only a few hundred tons. A few carloads of Southern iron have been sold for local delivery at $11 a ton, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	$25.04 to 27.04
S'th'n No. 2 fdy	17.01
Low phos., sil. 1 to 2, copper free	28.50 to 29.20
Silvery, sil. 8 per cent	26.79
Bess. ferrosilicon, 14-15 per cent	35.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

PLATES

This market is receiving more support from the car building industry, though individual orders are small. The Great Northern has placed a contract for 500 ore cars and the Minneapolis & St. Louis has ordered 100 flat cars and four gas-electric cars. The General American Tank Car Corpn. will build 300 cars in its own shops to be used in its leasing operations. These construction programs will call for about 10,000 tons of steel, most of which is expected to come to Chicago mills. Little can be learned of Western railroads' future plans for cars. At the moment new inquiries are almost nil. Oil storage tank construction is taking a more important place in consumption of steel. Following closely after substantial business a week ago, 6000 tons has been ordered for erection in the Southwest, and fresh inquiries total 3000 tons, part of which will go to a recently opened oil field in Texas. The use of plates for large diameter welded pipe remains at about the average volume of recent weeks. This source of business is a very important factor in present plate mill schedules. It is interesting to note the effect of special rolled sections on the plate market. Single sections, now being rolled at Chicago, are being used in highway bridges of 60 to 65-ft. spans. These sections eliminate web plates and in many cases single and sometimes double cover plates, all of which formerly went to plate mills. These sections are also cutting into the foundry field in that they are finding wide application in welded bases for heavy machinery, such as electric generators.

STRUCTURAL MATERIAL

This market remains one of some promise, but offers little in the way of actual business except in a larger number of small inquiries and lettings. Of foremost importance in Chicago is 6000 tons for the Outer Bridge, on which figures are being taken. This structure is the key to the large tonnage of steel that will be needed for the extension of Wacker Drive and the completion of the Randolph Street viaduct, and the impression is widespread that this work may not be started until about the time that the bridge which these streets service is practically completed. Bids are soon to be entered on 2000 tons for an auditorium at St. Paul. The new administration has taken hold of the Chicago city government and fabricators are anxiously watching developments in the hope that projects delayed at election time will now move forward.

BARS

The bar market, which can usually be taken as somewhat of an indicator of the use of steel, is not showing the snap the trade has come to expect at this time of year. In fact, the demand for bars has been a little sluggish, apparently finding difficulty in holding its customary place in relation to rolling schedules of other finished steel products. Road machinery builders still have satisfactory production schedules and they expect to remain busy well into the summer months. Operations at Western railroad shops are not only comparatively low, but they are also spotty, the result being that both new orders and specifications for iron bars are small.

The alloy bar market is not as lively as it was near the first of the month. This is due largely to the fact that specifications from automo-

bile manufacturers are somewhat smaller. Both specifications and spot orders for rail steel bars are making moderate gains, which are due for the most part to larger requirements by bed manufacturers. Prices on rail steel bars remain steady at 1.60c. to 1.65c. a lb., district mill. Shipments of fence posts are in about as large volume as moved last year at this time.

RAILS AND TRACK SUPPLIES

A single order for 2500 tons of standard-section rails has been placed at a local mill. No further word has come concerning the contemplated purchase of 23,000 tons by the Milwaukee Road, which at the first of the year had a sizable tonnage of rails in stock piles. The track accessory market is quiet, a condition which is unseasonable, but entirely in keeping with present rail laying programs. Output at rail mills is pointed downward, rollings now being in the range of 50 to 55 per cent of capacity. The Colorado Fuel & Iron Co. has temporarily shut down its rail mill at Pueblo, Colo., because of lack of releases against rail contracts.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 3.00c. to 3.10c.; No. 10 blue ann'l'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

REINFORCING BARS

Shipments of reinforcing bars for highway construction are moving faster, and the pace should increase as April advances. In the background are new lettings, one of which will be made this week by Illinois. Large tonnages for building work are very scarce, but orders ranging upward to 100 tons each are in fair number. Numerous estimates are being given on schools located in a wide territory. Shop operations are steady, but at a rate below normal for this time of year. A market of this kind does not afford a test of the price structure. Billet steel reinforcing bars are quoted 2c. a lb. out of warehouse.

CAST IRON PIPE

This market is characterized by a steady run of small but active projects. For the future there are a number of water works developments taking shape. Railroads are finding little use for cast iron pipe and utilities are entering light specifications. James B. Clow & Sons are low bidders at $35 a ton, Birmingham, on 18,000 ft. of 6 to 20-in. pipe for Oakfield, Wis., and the Glamorgan Pipe & Foundry Co. is low at $33, Birmingham, on 500 tons of 20-in. pipe at Chicago. The United States Pipe & Foundry Co. is said to have taken a tonnage at Canton, Ohio. Two Rivers, Wis., has ordered 3000 ft. of pipe from the Alabama Pipe Co., and Viroqua, Wis., will be furnished 3500 ft. of 4-in. pipe by the Central Foundry Co. Among new inquiries is one for 10,000 ft. of 10-in. and 1000 ft. of 6-in. pipe for Hastings, Neb.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43 to $44; 4-in., $46 to $47; Class A and gas pipe, $3 extra.

SHEETS

The local sheet market, which several weeks ago was highly sensitive, is reaching a more stable basis. Demand is again on the upgrade, and output has advanced to a range from 55 to 60 per cent of capacity. Prices here, though not quite as steady as in the immediate past, are not showing the wide variation that they are in and around Detroit. Specifications are now coming from a wider range of users. Container manufacturers are fairly busy, some of them reporting operations on a five-day a week basis. Demand for roofing has fallen back somewhat, but makers of gutters and downspouts are holding to schedules reached at the turn of the month. Stove manufacturers are busier and the jobbing trade shows moderate improvement.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 1.95c.; angle bars, 2.75c.

WIRE PRODUCTS

Demand for these commodities appears to have struck a dead level, which is affording producers an operating rate of 45 per cent of capacity. Although jobbers in general are opposed to carrying complete stocks, some of them have recently found it advisable to expand stocks of those commodities that usually move rapidly at this time of year. There is virtually no change in the rate of specifying by the manufacturing trade.

BOLTS, NUTS AND RIVETS

Recent activities by oil storage tank builders are resulting in heavier specifications and some spot buying from the source. Other industries remain cautious, with releases on the whole at the average of recent weeks. A drop in demand by farm implement manufacturers is offset by orders from automobile plants.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.90c.
Reinforcing bars, billet steel	2.00c.
Rail steel reinforcement	1.50c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands, $\frac{3}{8}$ in. (in Nos. 10 and 12 gages)	3.10c.
Hoops (No. 14 gage and lighter)	3.65c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes ($\frac{5}{8}$ in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach and lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

OLD MATERIAL

The local scrap market is in buyers' hands so far as prices are concerned. A small lot of heavy melting steel was taken by a mill last week at $10.25 a gross ton, delivered, but since that time all offers have been turned down and in addition consumers have reduced the number of cars that will be accepted daily at mills. The thought in the minds of most brokers is that prices will be forced to lower levels, and there is a disposition to sell short and thereby take advantage of a probable speculative feature of the market. On the other hand, there have been instances lately when the action of buyers could be interpreted to mean that it was not their desire to hammer prices down, a move which eventually results in freezing supplies. Cast iron borings are very dull in the local market. A few cars find their way from Chicago to out-of-town points of consumption. The only railroad list offered this week is one by the Burlington.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$9.75 to	$10.25
Shoveling steel	9.75 to	10.25
Frogs, switches and guards, cut apart, and misc. rails	9.75 to	10.25
Factory hyd. comp. sheets	8.00 to	8.50
Drop forge flashings	6.75 to	7.25
No. 1 busheling	7.75 to	8.25
Forg'd cast and r'l'd steel carwheels	12.50 to	13.00
Railroad tires, charg. box size	12.50 to	13.00
Railroad leaf springs cut apart	12.25 to	12.75
Axle turnings	8.50 to	9.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	11.00 to	11.50
Coil springs	12.50 to	13.00
Electric Furnace Grades:		
Axle turnings	8.75 to	9.25
Low phos. punchings	11.00 to	11.50
Low phos. plates, 12 in. and under	11.25 to	11.75
Blast Furnace Grades:		
Cast iron borings	4.75 to	5.00
Short shoveling turnings	4.50 to	5.00
Machine shop turnings	4.50 to	5.00
Rolling Mill Grades:		
Rerolling rails	12.00 to	12.50
Cupola Grades:		
Steel rails, less than 3 ft.	11.50 to	12.00
Steel rails, less than 2 ft.	12.50 to	13.00
Angle bars, steel	11.00 to	11.50
Cast iron carwheels	9.50 to	10.00
Malleable Grades:		
Railroad	11.50 to	12.00
Agricultural	10.75 to	11.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relaying rails, 65 lb. and heavier	22.00 to	27.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	9.75 to	10.25
Iron arch bars, and transoms	10.50 to	11.00
Iron car axles	18.00 to	19.00
Steel car axles	12.75 to	13.25
No. 1 railroad wrought	8.25 to	8.75
No. 2 railroad wrought	8.75 to	9.25
No. 1 busheling	6.00 to	6.50
No. 2 busheling	4.00 to	4.50
Locomotive tires, smooth	11.50 to	12.50
Pipes and flues	5.50 to	6.00
Cupola Grades:		
No. 1 machinery cast	9.50 to	10.00
No. 1 railroad cast	8.50 to	9.00
No. 1 agricultural cast	8.00 to	8.50
Stove plate	7.00 to	7.50
Grate bars	7.00 to	7.50
Brake shoes	7.75 to	8.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

CLEVELAND

Downtrend in Steel Orders Mostly Attributable to Automobile Industry

CLEVELAND, April 14.—Demand for finished steel took a downward trend the past week. This was more noticeable in sheets and in strip steel going to the motor car industry than in the heavy hot-rolled products. There are indications that April may be the peak month in motor car production this spring. Shipment of some sheet tonnage to one motor car manufacturer was held up during the week. Automobiles are moving rather slowly from dealers' stocks, and there are reports that cars are being forced on dealers in order to maintain present production schedules. That the Ford Motor Co. plans to slow down in a few weeks is commonly reported in the steel industry. While individual plants in some consuming industries are doing better than recently, the gain is not sufficient to take care of the slackening in the demand from automobile plants, nor is there the normal spring activity in the building field.

For the third successive week, steel plant operations in Cleveland have declined with the taking off of one open-hearth furnace, bringing operations down three points. These plants are now operating at 56 per cent of ingot capacity, compared with 70 per cent during the March peak. There was also some reduction in operation of sheet and hot and cold-rolled strip mills in this territory.

Prices are being fairly well maintained except on sheets, although concessions are reported on wide hot-rolled strip. Black sheets have again sagged in the Detroit territory, where quotations of 2.15c., Pittsburgh, have appeared. Scrap prices have declined to new low levels.

PIG IRON

The market does not show much life, although sales are holding to recent volume. While an occasional order is being taken for 500 to 1000 tons, most purchases are for small lots for early needs. Many consumers take the position that producers can supply iron promptly and there is no need to buy for extended deliveries. Demand from the motor car industry is holding up to recent volume and some business came out the past week from foundries in other fields that have been inactive for some time. Shipments are holding up slightly better than in March. Prices appear fairly steady in the absence of round lot inquiries to test the market. Foundry and malleable iron is quoted at $16 to $17, Lake furnace, except in Michigan, where $17 to $17.50 prevails. Cleveland furnaces quote $17 for local delivery.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.85c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.40c.
Cold-fin. flats and sq.	3.90c.
Hoops and bands, No. 12 to 1/4 in., inclusive	3.10c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	2.60c.
Galvanized sheets (No. 24)	4.00c.
Blue ann'l'd sheets (No. 10)	3.10c.
No. 9 ann'l'd wire, per 100 lb.	$2.35
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.25

*Net base, including boxing and cutting to length.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.00
S'th'n fdy., sil. 1.75 to 2.25	$16.51 to 17.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

BARS, PLATES AND SHAPES

Demand the past week showed a slight recession, although tonnage booked by some of the mills so far this month is equal to that taken during the same period in March. Conditions among consuming plants are spotty. Most orders are for small lots. Not many new building projects are coming out, and this situation is reflected in a light demand for fabricated work and for reinforcing bars. Merchant bars generally are being quoted at 1.70c., Cleveland, although 1.65c. is occasionally appearing. While reinforcing bars are still untested, these are not quotable above 1.65c., Cleveland. No deviation from the 1.65c., Pittsburgh, price on plates and shapes is reported. Most of the orders are against contracts taken at that price.

SHEETS

Demand is not holding up to recent volume. Orders from the motor car industry show a falling off, although some tonnage was placed during the week by the Ford Motor Co. The Fisher Body Corpn. will issue new releases about April 20 for its plant in Cleveland that is making Chevrolet bodies. This plant has a larger schedule for this week than its production during any previous week this year. Demand outside the motor car industry is slow. A concession to 2.15c., Pittsburgh, on black sheets has appeared in the Detroit territory and several mills have met the lower price. However, this reduction is not yet in evidence in this territory. While auto body sheets have been shaded to 3.10c. in Detroit, there was no new business during the week to test prices in this market. Auto body seconds are quoted at $45 a ton for No. 18 gage and $40 for No. 19 and No. 20 gage, or a decline from recent prices. Weakness has developed in jobbing mill prices, concessions appearing of $1 a ton to 1.85c. for No. 10 light plates and 2c. for No. 13 blue annealed. Galvanized sheets range from 2.85c. to 2.90c.

BOLTS, NUTS AND RIVETS

Demand for bolts and nuts is practically the same as in March. Jobbers are ordering in smaller volume than usual at this time of year and business is slack from the three larger consuming industries, railroads, motor car manufacturers and agricultural implement makers. The industry is operating at about 50 per cent of capacity. Rivets continue quiet.

OLD MATERIAL

Under the influence of a further restriction in the demand, prices have declined 25c. to 50c. a ton and the market has a weak tone. A Cleveland mill that has been taking a limited amount of blast furnace scrap has entirely shut off on shipments, and Valley mills are taking only small lots. There is no new demand from consumers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$9.75 to $10.25
No. 2 heavy melting steel	9.50 to 9.75
Compressed sheet steel	8.50 to 9.00
Light bundled sheet stampings	7.00 to 7.50
Drop forge flashings	7.50 to 8.00
Machine shop turnings	4.50 to 5.00
Short shoveling turnings	6.75 to 7.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	10.00 to 10.50
No. 1 busheling	8.00 to 8.50
Pipes and flues	5.50 to 6.00
Steel axle turnings	8.00 to 8.50
Acid Open-Hearth Grades:	
Low phos., billet bloom and slab crops	14.00 to 14.50
Blast Furnace Grades:	
Cast iron borings	6.50 to 7.00
Mixed borings and short turnings	6.50 to 7.00
No. 2 busheling	6.25 to 6.50
Cupola Grades:	
No. 1 cast	12.00 to 12.50
Railroad grate bars	6.00 to 6.50
Stove plate	6.00 to 6.50
Rails under 3 ft.	15.00 to 15.50
Miscellaneous:	
Rails for rolling	13.00 to 13.50
Railroad malleable	12.00 to 12.50

NEW YORK

Pipe Line Tonnage More Active—Pig Iron Dullness Continues

NEW YORK, April 14.—The dullness that has prevailed in the pig iron market for the past month is unrelieved. Few melters are interested in forward commitments. Castings orders are from hand to mouth and foundry costs are high, since in keeping an organization together until business improves there is not enough work to keep all hands busy.

The State barge canal is now open to navigation, but so far as can be learned no cargoes of iron have yet been shipped from Buffalo to Beacon, N. Y., or New York harbor.

Witherbee, Sherman & Co. plan to blow in one of their Port Henry, N. Y., furnaces some time in May.

Current pig iron business is largely of a spot character. Sales for the week total 4500 tons, compared with 6000 tons in the previous week and 5000 tons two weeks ago. The Worthington Pump & Machinery Corpn. is in the market for 100 tons for Elmwood Place, Ohio. The A. P. Smith Mfg. Co., East Orange, N. J., is inquiring for 500 tons of No. 2 plain and No. 2X, evenly divided, for delivery from May until September.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.90 to $35.90; 4-in. and 5-in., $37.90 to $38.90; 3-in., $44.90 to $45.90. Class A and gas pipe, $3 extra.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$19.91 to $20.41
*Buff. No. 2, del'd east N. J.	18.28 to 18.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	17.39 to 17.89
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	17.89 to 18.39

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

FINISHED STEEL

While demand for steel products is marked by some irregularity, local sales offices are receiving a volume of business this month that approximately equals the March average. However, gains in tonnage appear to have been checked. In some lines there has been a distinct slowing up in orders.

Pipe line tonnage is again more active. About 35,000 tons for the Sinclair oil interests, which has been dormant for some weeks, has come up again and the order may be placed shortly. The Texas Corpn. is inquiring for 52 miles of 10¾-in. O. D. pipe and eight miles of 8⅝-in. O. D. pipe, about 4500 tons, presumably for an oil line in the Southwest. Lapweld, seamless or electric weld will be accepted. The Department of Water, Gas and Electricity, New York, is inquiring for 1900 ft. of 60-in. pipe for the Croton reservoir, about 500 tons.

Steel companies are now quoting 1.70c. a lb., Pittsburgh, or 1.80c., Eastern basing points, for bars, plates and shapes, but not enough business has been done at this higher level to establish it. Nearly all consumers and jobbers are covered for the quarter at $1 a ton less. Blue annealed sheet prices are generally $1 a ton off at 1.85c. for No. 10 gage and 2c. for No. 13 gage, while black sheets are available from virtually all mills at 2.25c. and galvanized sheets at 2.85c. Hot-rolled strip steel has been shaded $1 a ton on a few orders.

COKE

Warm weather and persistent dullness in industry have had their effect on beehive coke prices, furnace coke having been sold at as low as $2.25 a net ton, Connellsville, and standard foundry coke at as low as $3.25 a net ton. Foundry coke quotations follow:

Special brands of beehive foundry coke, $4 to $4.25 a net ton, ovens, or $7.71 to $7.96, delivered to northern New Jersey, Jersey City and Newark, and $8.59 to $8.84 to New York and Brooklyn; by-product foundry coke, $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

WAREHOUSE BUSINESS

Individual orders for shipment of products from jobbers' stocks are slightly larger in most cases. Recent orders for structural steel have ranged up to 10 tons, the buyer evidently being unwilling to await shipment from a mill. Sheet prices are fairly well maintained, with only occasional concessions on the larger orders.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'l'd sheets (No. 10)	3.00c. to 3.25c.
Black sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

	Per 100 Ft.
Boiler Tubes:	
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

CAST IRON PIPE

Prices continue to lack firmness and, with keen competition for tonnage among Northern foundries, $32, base, is occasionally shaded. The Department of Water Supply, Gas and Electricity, New York, is inquiring for a small tonnage of cast iron pipe for a pumping station at the Croton reservoir, has opened bids on about 500 tons of pipe for the Borough of Richmond, and is inquiring for about 200 tons for delivery to various boroughs. The Washington suburban sanitary district opens bids April 15 on 1600 tons of pipe, and Middletown, N. Y., has been taking bids on 1500 tons of 6 to 24-in. pipe and fittings.

REINFORCING BARS

The quotation on ordinary tonnages of billet steel reinforcing bars continues at 1.65c. a lb., Pittsburgh, or 1.98c., New York, but on the larger contracts this price is subject to concessions of $1 and $2 a ton. About 254 tons of bars in the Kill van Kull bridge have been awarded, and bids have been opened on a general contract for about five miles of highway construction in local New Jersey, requiring about 1500 tons of bars.

OLD MATERIAL

Except for No. 1 heavy melting steel, which is still being bought by brokers at $10 a ton, delivered eastern Pennsylvania, and $7.25 to $7.50 a ton, on barge New York, for shipment to Buffalo, the scrap market is inactive and prices lack strength. Freight rates from New York and local New Jersey to eastern Pennsylvania consuming points will be reduced at the end of this month, as reported elsewhere in this issue.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$6.50 to $7.50
Heavy melting steel (yard)	4.75 to 5.25
No. 1 hvy. breakable cast	6.75 to 7.50
Stove plate (steel works)	4.75
Locomotive grate bars	4.75
Machine shop turnings	3.50
Short shoveling turnings	3.50
Cast borings (blast fur. or steel works)	3.50
Mixed borings and turnings	3.00
Steel car axles	12.50 to 13.50
Iron car axles	16.50 to 17.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.25
Forge fire	6.50 to 6.75
No. 1 railroad wrought	8.75
No. 1 yard wrought, long	7.75
Rails for rolling	9.25 to 9.75
Stove plate (foundry)	5.50 to 6.00
Malleable cast (railroad)	8.50 to 9.00
Cast borings (chemical)	8.00 to 8.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$12.50
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	10.50
No. 2 cast (radiators, cast boilers, etc.)	10.00

PHILADELPHIA

Steel Buying Smaller—Operations of Consumers Unchanged

PHILADELPHIA, April 14.—While there has been a recession in steel buying this month, sellers point out that operating rates of consumers of pig iron and steel are generally unchanged. There is evident, however, a lack of confidence that further improvement will develop in the immediate future, so that consumers are not inclined to cover their requirements even a few weeks in advance. Meanwhile, prices are holding on plates, shapes and bars, but still are irregular on sheets. Contracting for second quarter delivery has been small, but the few commitments made have been on a basis of 1.65c., Pittsburgh. Reinforcing bar prices continue to show a downward trend, so that 1.65c., Pittsburgh, applies only on the smaller lots, concessions of $1 to $2 a ton being common on larger projects.

PIG IRON

No. 2 foundry iron is quoted at $17 per ton, base, by eastern Pennsylvania furnaces, occasional concessions of 50c. a ton still appearing on desirable business. Contracting for second quarter has been limited, but in certain cases foundries have placed 100 tons or more to cover their requirements, based on continuation of present production schedules. Southern producers are maintaining $11 a ton, furnace, for foundry iron, and show no inclination to shade this price on any orders of the size being placed at present. Recent purchases of low phosphorus iron have been at the quoted price for this grade, orders being too small to justify any concessions.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$17.76 to $18.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	18.26 to 18.76
East. Pa. No. 1X	18.76 to 19.26
Basic (del'd east. Pa.)	17.25 to 17.50
Malleable	19.00 to 20.00
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

STEEL BARS

Most consumers have been covered for the current quarter at 1.65c., Pittsburgh, or 1.94c., Philadelphia, and mills are asking 1.70c., Pittsburgh, or 1.99c., Philadelphia, on new business. No orders of any consequence are in the market, however, so that the advanced price has not been subjected to a real test. Reinforcing bar prices are decidedly lacking in firmness, and 1.65c., Pittsburgh, or 1.94c., Philadelphia, has become the maximum quotation for small lots, the more substantial contracts bringing concessions of $1 to $2 a ton from distributers and mills. Recent sizable contracts awarded in this district include 2000 tons of bars placed for a bridge at Somers Point, N. J. Rail steel bars are nominally quoted at 1.35c., Pittsburgh, or 1.64c., Philadelphia.

SHAPES

On new business mills are generally quoting 1.75c., f.o.b. nearest mill to consumer, or 1.81c., Philadelphia, except on small miscellaneous specifications, which occasionally bring 1.80c., mill, or 1.86c., Philadelphia. Meanwhile, a number of price protections on specific projects are outstanding at 1.70c., f.o.b. mill, or 1.76c., Philadelphia. Substantial tonnages of steel for bridge and other public construction have been awarded recently, but the smaller fabricating shops are in need of business.

PLATES

Contracting has been at 1.75c., Coatesville, Pa., or 1.85½c., Philadelphia, and this is the current price on all new business, 1.80c., Coatesville, or 1.90½c., Philadelphia, applying only on the small miscellaneous specifications, such as are often shipped from warehouse stocks.

SHEETS

Operating rates of consumers in this district are generally unchanged, but sheet consumers in general are not inclined to cover their requirements in advance until the future course of business appears more certain. Prices continue irregular, black sheets ranging from 2.25c. to 2.30c., Pittsburgh, or 2.54c. to 2.59c., Philadelphia, and galvanized from 2.80c. to 2.85c., Pittsburgh, or 3.09c. to 3.14c., Philadelphia. Blue annealed sheets, No. 13 gage, range from 2c. to 2.05c., Pittsburgh, or 2.29c. to 2.34c., Philadelphia, and blue annealed plates from 1.85c. to 1.90c., Pittsburgh, or 2.14c. to 2.19c., Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.50c. to 2.60c.
Cold-fin. steel, rounds and hex	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅜-in. inclu.	2.90c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.60c.
†Galvanized sheets (No. 24)	4.15c.
Light plates, blue annealed (No. 10)	3.05c.
Blue ann'l'd sheets (No. 13)	3.20c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

IMPORTS

In the week ended April 11, a total of 5474 tons of pig iron arrived at this port from British India, and 30 tons of ferromanganese was received from the United Kingdom. Steel imports consisted of 268 tons of structural shapes and 81 tons of steel bars from Belgium, and 20 tons of bearing tubes and 12 tons of bearing bars from Sweden.

OLD MATERIAL

Based on recent offers of scrap by brokers, prices of certain grades are off about 50c. a ton. On about 2800 tons of steel scrap, at the New York Shipbuilding Corpn., Camden, N. J., an eastern Pennsylvania mill with a $1.13 freight rate quoted $9.25 per ton, f.o.b. Camden, for 1000 tons of No. 1 heavy melting steel, and a high bid of $11 a ton was received for 900 tons of ship plate scrap. Transactions as a rule, however, are limited in the present market to contracts for a few carloads of material.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	8.50
Heavy melting steel (yard)	8.00
No. 1 railroad wrought	11.00 to 11.50
Bundled sheets (for steel works)	9.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	7.50 to 8.00
Machine shop turnings (for steel works)	7.50
Heavy axle turnings (or equiv.)	9.50 to 10.00
Cast borings (for steel works and roll. mill)	7.50
Heavy breakable cast (for steel works)	11.00 to 11.50
Railroad grate bars	9.00
Stove plate (for steel works)	9.00
No. 1 low phos., hvy., (0.04% and under)	15.50 to 16.00
Couplers and knuckles	14.00 to 15.00
Rolled steel wheels	14.00 to 15.00
No. 1 blast f'nace scrap	6.00
Wrot. iron and soft steel pipes and tubes (new specific.)	11.50 to 12.00
Shafting	18.00
Steel axles	17.50 to 18.00
No. 1 forge fire	10.50
Cast iron carwheels	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	12.50 to 13.00

▲ ▲ ▲

Revere Copper & Brass, Inc., has moved its executive, sales and advertising departments from Rome, N. Y., to the New York Central Building, New York City. C. Donald Dallas, president; George F. Stanton, vice-president and general sales manager; and J. A. Doucett, vice-president and assistant general sales manager, will make their headquarters in New York.

BIRMINGHAM

Pig Iron Buying Mostly for Nearby Needs—Steel Demands Steady

BIRMINGHAM, April 14.—Pig iron activity continues spotty and sluggish. Contract tonnage is scattered, most of the buying being for early requirements. Quotations remain at $12 to $13 for the Southern market. Shipments thus far this month are taking care of current production. Gulf States Steel switched its furnace from foundry to basic last week, so that four are now on basic, seven on foundry, one on recarburizing iron and one on ferromanganese, a total of 13 for the district.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00 to $13.00
No. 1 fdy., 2.25 to 2.75 sil.	12.50 to 13.50
Basic	12.00 to 13.00

CAST IRON PIPE

Spring tonnage has not yet come up to expectations. Orders for small amounts are fairly steady, but not sufficient to change the situation as it has existed for some weeks. Plant schedules are around 60 per cent. Prices remain on a $35 to $36 base.

FINISHED STEEL

There has been no particular change in steel for some time past. New business from one week to another is in about the same volume. Demand is well distributed among various lines, with sheets lagging. New business of fabricators of structural steel and reinforcing bars is in small tonnages. Ingalls Iron Works, however, secured 200 tons for a plant addition at Laurel, Miss. Open-hearth operations continue unchanged.

COKE

The market remains dull, with very little additional demand other than for contract tonnage. Quotations are still $5. Central Iron & Coal Co., at Holt, Ala., has reduced its by-product plant operations from 60 to 24 ovens.

OLD MATERIAL

Heavy steel scrap is moving somewhat better, but other lines are quiet. The steel mills are not in the market and other customers have restricted their demands. Prices, which have been on a nominal basis for some time, have been revised downward.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	10.00
Short shoveling turnings	7.50
Cast iron borings	(No market)
Stove plate	7.50
Steel axles	15.00 to 16.00
Iron axles	18.00
No. 1 railroad wrought	8.00
Rails for rolling	11.50 to 12.00
No. 1 cast	10.00
Tramcar wheels	11.00 to 11.25
Cast iron borings, chem.	13.50
Cast iron carwheels	11.00

▲▲▲

ST. LOUIS

Scrap Prices Reduced Further—Pig Iron and Steel Buying Slow

ST. LOUIS, April 14.—Melters of pig iron in the St. Louis industrial district continue to suit their buying mood to the extent of their order files, which are small. Melters seem to feel that the price situation is firm and that the market may go higher, but they would prefer to take the chance of paying more when and if the demand for their finished products warrants any considerable buy of pig iron. Meanwhile, small fill-in business is being received by the makers. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

FINISHED MATERIAL

The low bidder on the concrete work to be done in connection with the East St. Louis approach to the St. Louis municipal bridge is the Moore Brothers Construction Co., East St. Louis, which is uncommitted for the reinforcing bars, a total of 1015 tons. The Laclede Steel Co. has been awarded 620 tons of reinforcing bars for a veterans' hospital at Waco, Tex. The McClintic-Marshall Corpn. will supply the Missouri Pacific with a 250-ton girder span for a project at Webster Groves, Mo. Demand for plates, shapes and bars is quiet.

Warehouse business for March showed an average daily gain of about 10 per cent over February. In fact, there has been a steady, although small, gain since the low point of last December.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.60c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.10c.
Galv. corrug. sheets	4.65c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60 and 10
Carriage bolts	60 and 10
Lag screws	60 and 10
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10

OLD MATERIAL

A round tonnage of heavy melting steel was placed during the week by a district melter with several dealers, the transactions having been followed by a reduction of 25c. a ton in the prices by dealers. No. 2 railroad wrought, cast iron borings and shoveling turnings, rails for rolling, cast iron car wheels and No. 1 railroad cast also are off 25c. a ton. A reduction of 50c. a ton is reported for railroad springs and bundled sheets, and a $1.50 a ton reduction for iron car axles.

Railroad lists follow: Louisville & Nashville, 7000 tons; Chesapeake & Ohio, 3622 tons; Wabash, 1470 tons; Chicago, Rock Island & Pacific, 56 carloads; Nashville, Chattanooga & St. Louis, 26 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$8.75 to	$9.25
No. 1 heavy melting or shoveling steel	8.25 to	8.75
No. 2 heavy melting or shoveling steel	7.75 to	8.25
No. 1 locomotive tires	10.00 to	10.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	9.25 to	9.75
Railroad springs	11.00 to	11.50
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.25 to	8.50
No. 1 busheling	6.00 to	6.50
Cast iron borings and shoveling turnings	5.50 to	6.00
Iron rails	8.00 to	8.50
Rails for rolling	10.25 to	11.00
Machine shop turnings	3.00 to	3.50
Heavy turnings	7.00 to	7.50
Steel car axles	12.50 to	13.00
Iron car axles	17.50 to	18.00
Wrot. iron bars and trans.	9.00 to	9.50
No. 1 railroad wrought	7.00 to	7.50
Steel rails, less than 3 ft.	12.00 to	12.50
Steel angle bars	9.00 to	9.50
Cast iron carwheels	8.50 to	9.00
No. 1 machinery cast	9.00 to	9.50
Railroad malleable	10.00 to	10.50
No. 1 railroad cast	8.50 to	9.00
Stove plate	7.00 to	7.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	9.00 to	9.50

▲▲▲

Advertising and publicity departments of the Youngstown Sheet & Tube Co., Youngstown, are being concentrated under the general direction of Myron S. Curtis, who has charge of sales promotion. Mr. Curtis was formerly identified with the sales department. R. J. Kaylor, who has been advertising manager for many years, continues in this capacity, assisted by William H. Texter, formerly in the sales promotion department of the National Association of Flat Rolled Steel Manufacturers.

▲▲▲

Lincoln Electric Co., Cleveland, manufacturer of welding equipment and motors, has moved its Chicago office from 53 West Jackson Boulevard to a new building at 1455 West Thirty-seventh Street, where it will have additional storage space for a complete stock of welders, welding supplies and accessories.

BOSTON

Fabricated Structural Steel and Cast Iron Pipe Markets Active

BOSTON, April 14.—It was a rather colorless week in pig iron, sales totaling less than 1200 tons. Little new business of importance is developing. One melter is still sounding out the market on 4000 to 5000 tons, but gives no assurance a purchase will be made. Another consumer will probably be in the market around May 1 for 2000 tons. A Buffalo district furnace is still offering iron at $15 a ton, base furnace, but all others soliciting business in New England are on a $16 basis.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.91 to $20.91
*Buffalo, sil. 2.25 to 2.75	19.91 to 20.91
*Ala., sil. 1.75 to 2.25	20.11 to 20.61
*Ala., sil. 2.25 to 2.75	20.61 to 21.11
†Ala., sil. 1.75 to 2.25	16.75
†Ala., sil. 2.25 to 2.75	17.25

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

REINFORCING BARS

Sales did not exceed 250 tons in small lots, and new projects totaled but 300 tons in the week. The market gives evidence of being more active this week owing to the closing of jobs pending for some time. Prices are steady. Billet steel bars from stock are 3c. a lb. for 1 to 5-ton lots, 2.40c. for 6 to 99-ton lots, and 2.30c. for 100-ton lots and larger. Rail steel bars are 2.26½c. a lb., delivered Boston rate points.

CAST IRON PIPE

About 2500 tons of pipe was sold the past week. The Warren Foundry & Pipe Co. again took the major part of the business, including 250 tons of 6 to 12-in. pipe for Watertown, Mass.; 10,000 ft. of 6 to 12-in. for Revere, Mass.; 470 tons of 6 to 12-in. for Malden, Mass.; 120 tons of 6 and 8-in. for Somerset, Mass.; 100 tons for Andover, Mass., all of which will be made at the company's new Everett, Mass., foundry, and several hundred tons additional in small lots. That company was the low bidder on 100 tons of 6, 10 and 12-in. pipe required by Brookline, Mass., but no award has been made. R. D. Wood & Co. sold 365 tons of 4 to 16-in. Class 150 pipe to Arlington, Mass., and the United States Pipe & Foundry Co. took a round tonnage from Wakefield, Mass. Cambridge, Mass., opened bids April 13 on 100 tons, but has made no award. While Class B pipe is generally quoted at $34 a ton, f.o.b. foundry, that price has been cut, and prices for other classes of pipe are decidedly unsettled.

FABRICATED STEEL

Lettings the past week totaled more than 14,000 tons, the largest for any similar period in months, and included 10,000 tons for a local and 850 tons for a Springfield, Mass., Post Office, 500 tons for an Ansonia, Conn., brass mill, 330 tons for a New Hampshire bridge, 160 tons for an Everett, Mass., chemical plant unit, 150 tons for a Maine bridge and miscellaneous small jobs. A thousand tons in three projects is up for figuring, and indications are that several jobs hanging over the market for some time will be closed this month. Competition for work is very keen, and some low prices are being made for fabricating.

OLD MATERIAL

Not enough material is moving out of New England for Pennsylvania consumption to make such business a market factor. There is, however, a limited market for No. 1 heavy melting steel, T rails and bundled skeleton for Worcester, Mass. Brokers are paying $7 to $7.25 a ton, on cars shipping point, for No. 1 heavy melting steel and T rails and $6.10 for bundled skeleton. A few small lots of textile machinery for New England consumption were sold the past week at $10 to $10.50 a ton, delivered, and scattered carlots of No. 1 machinery cast at the same price range. A Norwood, Mass., user is reported to have bought some stove plate at $6.75 a ton, delivered.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

*No. 1 heavy melting steel	$7.00 to $7.25
*Scrap T rails	7.00 to 7.25
Scrap girder rails	5.50 to 6.00
No. 1 railroad wrought	7.00 to 7.50
Machine shop turnings	2.00 to 2.50
Cast iron borings (steel works and rolling mill)	2.00 to 2.50
*Bundled skeleton, long	6.00 to 6.10
Forge flashings	5.50 to 6.00
Blast furnace borings and turnings	2.00 to 2.50
Forge scrap	5.00 to 5.50
Shafting	13.00 to 13.50
Steel car axles	14.00 to 15.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	5.60 to 6.10
Rails for rolling	8.50 to 9.00
Cast iron borings, chemical	9.00 to 9.60
No. 2 cast	5.10 to 5.60

Prices per gross ton deliv'd consumers' yards:

Textile cast	$10.00 to $10.50
No. 1 machinery cast	10.00 to 10.50
Stove plate	7.00 to 7.25
Railroad malleable	13.00 to 13.50

*For New England consumption.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36½c.
Structural shapes—	
Angles and beams	3.36½c.
Tees	3.36½c.
Zees	3.36½c.
Soft steel bars, small shapes	3.26½c.
Reinforcing bars	3.11½c. to 3.26½c.
Iron bars—	
Refined	3.26½c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

▲▲▲

PACIFIC COAST

Awards of Sizable Tonnages Light—Plate Prices Weak

SAN FRANCISCO, April 10 (*By Air Mail*).—Conditions in the Pacific Coast iron and steel markets have shown little change. The week brought very few sales or inquiries of importance. The largest awards were 500 tons of reinforcing bars for a bridge in Oregon and 1600 tons of cast iron pipe for two British Columbia projects.

Pig iron prices per gross ton at San Francisco:

*Utah basic	$22.00 to $24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

BARS

Demand for mild steel bars is confined to relatively small lots. Prices hold around 2.10c., c.i.f. Awards of reinforcing steel bars exceeded 1400 tons. Unnamed interests took 200 tons for a laboratory building in Pasadena, 283 tons for four bridges in Lane County, Ore., and 248 tons for paving work in San Diego County, Cal. New inquiries call for 108 tons for a bridge over the Ell River in California. Bids have been opened on 254 tons and 123 tons respectively for paving work in San Mateo and Santa Barbara Counties, Cal. San Francisco quotations on out-of-stock material remain firm at 2.60c., base, in carload lots. Los Angeles prices hold at 2.50c., base.

PLATES

The only plate award of note called for 400 tons for 60 steel pontoons for

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.50c.
Soft steel bars	2.50c.
Black sheets (No. 24)	4.15c.
Blue ann'l'd sheets (No. 10)	3.05c.
Galv. sheets (No. 24)	4.65c.
Struc. rivets, ½-in. and larger	5.00c.
Com. wire nails, base per keg	$3.35
Cement c't'd nails, 100 lb. keg	3.35

the United States Engineer Office, Portland, placed with King Brothers. Pending business includes 300 tons for a floating derrick for Mare Island and 400 tons for four steel derrick scows for the United States Engineer Office, Portland. Prices are weak at 2c. to 2.05c., c.i.f.

SHAPES

The only shape award in excess of 100 tons was placed with an unnamed interest and involved 250 tons for a bridge in Johnson County, Wyo. Most of the pending business is for State and county work. Bids are being taken on 750 tons for an automobile sales building in Los Angeles. Bids will be opened April 29 on 303 tons and 198 tons respectively for bridges over the Ell River and Clear Creek, Cal. Shapes are quoted at 2.05c. to 2.15c., c.i.f.

CAST IRON PIPE

Edmonds, B. C., placed 757 tons of 4 to 8-in. Classes C and D pipe for Burnaby, B. C., with Evans, Coleman & Evans. Vancouver, B. C., awarded 230 tons of 12-in. Class 150 to the same company and 688 tons of 12-in. Class B to Gordon & Belyea. In addition, Leity, Murray & Co. secured 200 tons of 12-in. steel pipe, which will be furnished by a French maker. Los Angeles has opened bids on 2725 tons of 16 to 24-in. Class B pipe and will take bids April 16 on 2896 tons of 6 and 12-in. Class B pipe. Seattle has opened bids on 900 tons for the West Seattle project.

SHEETS

Sales and inquiries involve small lots only. Galvanized sheets are quoted at 3.50c., base, c.i.f., black sheets at 3c., and blue annealed sheets, No. 10 gage, at 2.50c., base, c.i.f.

▲▲▲

Iron and steel products totaling 1,415,000 cargo tons moved from the Atlantic to the Pacific Coast through the Panama Canal during the fiscal year 1930, according to the Shipping Board. This constituted almost 50 per cent of the total westbound intercoastal traffic of 2,934,180 tons.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex. Squares	3.80c. 4.30c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.40c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

CINCINNATI

Pig Iron Buying for Immediate Needs—Sheet Sales Decline

CINCINNATI, April 14.—The first two weeks of the second quarter have not brought any definite indication that local consumers of pig iron intend to enter the market for more than immediate requirements. The character of the demand continues to be spotty, with buyers taking only small quantities. Sales in the past week were approximately 2300 tons, of which about 300 tons in carload lots went to Southern furnaces. Despite the sluggishness of demand, prices on both Northern and Southern iron are being maintained, except for a few competitive weak spots on Northern iron. Two central Ohio consumers entered the market during the week for 500 and 300 tons of Northern foundry iron respectively.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.19 to $14.69
Ala. fdy., sil. 2.25 to 2.75	14.69 to 15.19
Tenn. fdy., sil. 1.75 to 2.25	14.19 to 14.69
S'th'n Ohio silvery, 8 per cent	24.39

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

FINISHED STEEL

While orders of district sheet mills are short of the previous week's demand, bookings for the past week were about 20 per cent of capacity. Operations of district mills have been maintained at better than 50 per cent. Demand continues to be for immediate shipment.

OLD MATERIAL

Reflecting the slowness of demand in other markets, the local scrap iron and steel market is dull. Current prices are virtually nominal. The Louisville & Nashville, the Chesapeake & Ohio and the Southern are offering their usual lists.

Dealers' buying prices per gross ton, t.o.b. cars, Cincinnati:

Heavy melting steel	$8.75 to	$9.25
Scrap rails for melting	10.50 to	11.00
Loose sheet clippings	4.75 to	5.25
Bundled sheets	8.25 to	8.75
Cast iron borings	4.75 to	5.25
Machine shop turnings	5.00 to	5.50
No. 1 busheling	7.25 to	7.75
No. 2 busheling	4.25 to	4.75
Rails for rolling	11.50 to	12.00
No. 1 locomotive tires	10.00 to	10.50
No. 2 railroad wrought	8.75 to	9.25
Short rails	13.75 to	14.25
Cast iron carwheels	10.50 to	11.00
No. 1 machinery cast	13.00 to	13.50
No. 1 railroad cast	11.50 to	12.00
Burnt cast	6.50 to	7.00
Stove plate	6.50 to	7.00
Brake shoes	6.50 to	7.00
Agricultural malleable	11.00 to	11.50
Railroad malleable	12.00 to	12.50

▲▲▲

Canada

Pig Iron Demand More Active

TORONTO, April 14.—The demand for merchant pig iron was quite active during the week, with sales running largely to spot delivery. Due to the fact that most melters who place forward contracts are now covered to the end of June, contract placing has dwindled off, and only a few melters have yet to cover. Bookings for second quarter are said to run somewhat ahead of those for the first three months of the year, but are somewhat below the tonnage involved in second quarter business last year. Foundries are the principal buyers. The demand for basic iron is quiet. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	20.50

STRUCTURAL STEEL

The demand for building steel is holding steady. Most orders in the week closed were from 100 tons downward, although a few contracts were placed for larger tonnages. Awards totaled about 12,000 tons for Ontario and Quebec. Bridge construction is still responsible for most of the new business.

OLD MATERIAL

The market is showing improvement, but sales continue almost exclusively in small tonnage lots for spot delivery. Shipments of steel scrap are going to the Hamilton district, but dealers are still holding deliveries to small tonnages owing to the strictness of specifications of the Steel Co. of Canada. Dealers have not yet revised price lists, pointing out that, with the exception of machinery cast, they are not interested in adding to stock holdings.

Dealers' buying prices for old material:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00
Per Net Ton		
No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

BUFFALO

Steel Operations Unchanged—Pig Iron Market Still Quiet

BUFFALO, April 14.—The pig iron market is very quiet. Sales probably were not more than 3000 to 3500 tons. Shipments against old orders have been good. Most of the iron being sold is for prompt delivery. The barge canal is open for shipments of iron to the East, but the movement is not large because stocks at Eastern storage points are still quite ample. Prices are being maintained in this district. Some furnaces are adhering to $16 in the East, and others are shading this figure.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.50
No. 2X fdy., sil. 2.25 to 2.75	18.00
No. 1 fdy., sil. 2.75 to 3.25	19.00
Malleable, sil. up to 2.25	18.00
Basic	17.50
Lake Superior charcoal	27.28

FINISHED STEEL

Operations of Buffalo mills are about the same as last week, with the Lackawanna plant of the Bethlehem Steel Co. operating 12 open-hearths; the Donner plant of the Republic Steel Corpn., three; Wickwire Spencer, two, and Gould Coupler Co., one. The Seneca Iron & Steel Co. is operating between 50 and 60 per cent. Structural fabricators and reinforcing bar makers report a considerable volume of small jobs.

OLD MATERIAL

A purchase by the leading consumer in the district of 2000 tons of No. 1 heavy melting steel and No. 2 heavy melting steel at $11 and $9.50 respectively has been made. This concern has also been buying direct from the railroads and has paid at least one road $11.25, which, with an 18c. freight rate, brought the price up to $11.43, delivered plant. It has also paid $11.25, delivered plant, on direct purchases from producers. Prices of most grades have softened.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$11.00 to	$11.25
No. 2 heavy melting scrap	9.50 to	9.75
Scrap rails		11.00
Hydraul. comp. sheet	9.50 to	9.75
Hand bundled sheets	8.00 to	8.50
Drop forge flashings	9.50 to	9.75
No. 1 busheling	9.50 to	9.75
Hvy. steel axle turnings	10.50 to	11.00
Machine shop turnings	5.00 to	5.50
No. 1 railroad wrought	9.00 to	9.50
Acid Open-Hearth Grades:		
Knuckles and couplers	12.50 to	13.00
Coil and leaf springs	12.50 to	13.00
Rolled steel wheels	12.50 to	13.00
Low phos. billet and bloom ends	14.00 to	14.50
Electric Furnace Grades:		
Short shov. steel turnings	8.00 to	8.50
Blast Furnace Grades:		
Short mixed borings and turnings	7.00 to	7.25
Cast iron borings	7.00 to	7.25
No. 2 busheling		6.00
Rolling Mill Grades:		
Steel car axles	15.00 to	15.50
Iron axles	16.00 to	16.50
Cupola Grades:		
No. 1 machinery cast	10.00 to	10.50
Stove plate	9.00 to	9.25
Locomotive grate bars	8.00 to	8.25
Steel rails, 3 ft. and under	13.50 to	14.00
Cast iron carwheels	12.50 to	13.00
Malleable Grades:		
Industrial	11.00 to	12.00
Railroad	11.00 to	12.00
Agricultural	11.00 to	12.00
Special Grades:		
Chemical borings	9.50 to	10.00

▲ ▲ ▲

Detroit Scrap Shows Further Weakness

DETROIT, April 14.—Lack of demand on the part of consumers, coupled with a relatively large tonnage of scrap accumulated from automobile plants, brought further price recessions the past week. Borings and short turnings, compressed sheets and sheet clips are down 25c. a ton and long turnings 50c. Heavy melting steel has not changed, but is showing a weaker tendency. Sentiment is bearish among local dealers, who look for still lower prices before the end of the month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$8.75 to	$9.25
Borings and short turnings	4.00 to	4.50
Long turnings	3.25 to	3.75
No. 1 machinery cast	9.25 to	9.75
Automotive cast	11.25 to	11.75
Hydraul. comp. sheets	8.25 to	8.75
Stove plate	6.50 to	6.75
New No. 1 busheling	7.00 to	7.50
Old No. 2 busheling	3.00 to	3.50
Sheet clippings	5.50 to	5.75
Flashings	7.50 to	8.00

▲ ▲ ▲

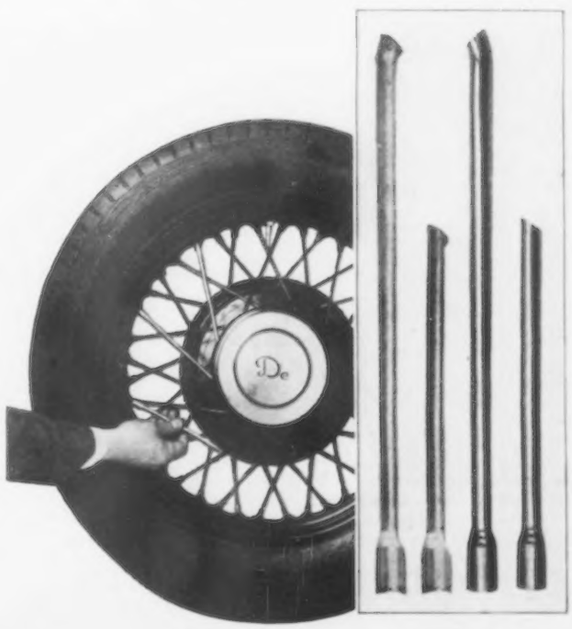
Perry Furnace Co., Erie, Pa., is planning expansion and improvement at coke plant, including installation of screening, conveying and other equipment.

▲ ▲ ▲

NEW RUSTLESS STEEL COVER FOR WIRE WHEEL SPOKES

THE trend toward increased use of highly polished metal trim for automobiles has been responsible for the development by the Budd Wheel Co., Philadelphia, of a half-tube of rustless steel for application to the outside half of any enameled wire wheel spokes. The new product, which is termed by the maker a "snap spoke" is of No. 10 gage rustless steel, formed to fit the contour and more than half the circumference of any ordinary wire wheel spoke, from rim to hub shell.

As the steel is hard and has considerable spring, the covering will snap into place, holding so firmly that it can be removed only with considerable difficulty, eliminating the possibility of looseness and rattle. These spoke coverings are being made for most of the current model cars and are said by the maker to cost no more than a good coat of enamel on the spokes of a wire wheel.



Semi-Finished Steel, Raw Materials, Bolts and Rivets

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$30.00
Rerolling, 4-in. and under 10-in., Youngstown	30.00
Rerolling, 4-in. and under 10-in., Cleveland	30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	36.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00 to $37.00
Cleveland	35.00 to 37.00
Chicago	35.00 to 37.00

PRICES OF RAW MATERIAL

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52%	24c. to 26c.
Manganese ore, Brazilian, 46 to 48%	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $12.50

	Per Gross Ton
Chrome ore, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$20.00
Chrome ore, 48% Cr_2O_3 crude, c.i.f. Atlantic seaboard	22.50

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.50
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry, by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.35 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.40 to 1.50
Gas coal, 3¼-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.65 to .75
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.15

Ferromanganese

	Per Gross Ton
Domestic 80% seaboard	*$80.00 to $85.00
Foreign, 80% Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	39.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$25.00	13%	$29.00
11%	26.00	14%	31.00
12%	27.00	15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$21.00	11%	$24.00
7%	21.50	12%	25.00
8%	22.00	13%	27.00
9%	22.50	14%	29.00
10%	23.00	15%	31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd, carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	122.50
Silico-manganese, gross ton, delivered	135.00

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$14.00 to 14.50
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$40.00 to $43.00	$32.00 to $35.00
Maryland	40.00 to 43.00	32.00 to 35.00
New Jersey	40.00 to 43.00	.....
Ohio	40.00 to 43.00	32.00 to 35.00
Kentucky	40.00 to 43.00	32.00 to 35.00
Missouri	40.00 to 43.00	32.00 to 35.00
Illinois	40.00 to 43.00	32.00 to 35.00
Ground fire clay, per ton	6.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	49.00
Birmingham	47.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	*73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	73
Semi-finished hexagons castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh.	80, 10, 10 and 5
Stove bolts in packages, Chicago	80, 10, 10 and 5
Stove bolts in packages, Cleveland	80, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2½
Stove bolts in bulk Chicago	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(⅝-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
f.o.b. Pittsburgh mill	1.65c. to 1.70c.
f.o.b. Chicago	1.75c. to 1.80c.
del'd Philadelphia	1.94c. to 1.99c.
del'd New York	1.98c. to 2.03c.
f.o.b. Cleveland	1.65c. to 1.70c.
f.o.b. Lackawanna	1.75c. to 1.80c.
f.o.b. Birmingham	1.80c.
f.o.b. Pacific ports	2.25c.
f.o.b. San Francisco mills	2.25c.

Billet Steel Reinforcing

f.o.b. P'gh mills, 40, 50, 60-ft.	1.75c.
f.o.b. Birmingham, mill lengths	1.75c. to 1.80c.

Rail Steel

f.o.b. mills, east of Chicago dist.	1.50c. to 1.55c.
f.o.b. Chicago Heights mill	1.60c. to 1.65c.
del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.75c. to 1.80c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
f.o.b. Fittsburgh mill	1.65c. to 1.70c.
f.o.b. Chicago	1.75c. to 1.80c.
f.o.b. Birmingham	1.80c.
del'd Cleveland	1.83½c.
del'd Philadelphia	1.85½c.
f.o.b. Coatesville	1.75c. to 1.80c.
f.o.b. Sparrows Point	1.75c. to 1.80c.
f.o.b. Lackawanna	1.75c. to 1.80c.
del'd New York	1.93c. to 1.98c.
f.o.f. Pacific ports	2.05c.

Structural Shapes

	Base per Lb.
f.o.b. Pittsburgh mill	1.65c. to 1.70c.
f.o.b. Chicago	1.75c. to 1.80c.
f.o.b. Birmingham	1.80c.
f.o.b. Lackawanna	1.75c. to 1.80c.
f.o.b. Bethlehem	1.75c. to 1.80c.
del'd Cleveland	1.83½c.
del'd Philadelphia	1.76c.
del'd New York	1.90½c. to 1.95½c.
f.o.f. Pacific ports	2.15c. to 2.25c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.65c.
Wider than 6 in., P'gh	1.50c. to 1.55c.
6 in. and narrower, Chicago	1.75c. to 1.80c.
Wider than 6 in., Chicago	1.65c. to 1.70c.
Cooperage stock, P'gh	1.80c. to 1.90c.
Cooperage stock, Chicago	1.80c. to 1.90c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.25c.
Strips, Cleveland	2.25c.
Strips, deliv'd Chicago	2.53c.
Strips, Worcester	2.40c. to 2.50c.
Cooperage stock, No. 20 gage, Pittsburgh or Cleveland	3.30c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Base per Lb.
Bright wire	2.20c. to 2.30c.
Spring wire	3.20c. to 3.30c.

To Jobbing Trade

	Base per Lb.
Smooth annealed wire	2.35c. to 2.45c.
Smooth galvanized wire	2.80c. to 2.90c.
Polished staples	2.35c. to 2.45c.
Galvanized staples	2.60c. to 2.70c.
Barbed wire, galvanized	2.55c. to 2.65c.
Woven wire fence, per net ton	$60.00

	Base per Keg
Standard wire nails	$1.90 to $2.00
Smooth coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00

To Retail Trade

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.
	Base per Keg
Standard wire nails	$2.00 to $2.10
Cement coated nails	2.00 to 2.10
Galvanized nails	4.00 to 4.10
	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire galvanized	2.65c. to 2.75c.
Woven wire fence per net ton	$65.00

Anderson, Ind., mill prices are ordinarily $3 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton under Pittsburgh.

Light Plates

Base per Lb.

No. 10, blue annealed, f.o.b. P'gh	1.85c. to 1.90c.
No. 10, blue annealed, f.o.b. Chicago dist.	1.95c. to 2.00c.
No. 10, blue an'l'd, del'd Phila.	2.14c. to 2.19c.
No. 10, blue annealed, B'ham	2.00c. to 2.05c.
No. 10, blue annealed, Pacific Coast ports	2.50c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.00c. to 2.05c.
No. 13, f.o.b. Chicago dist.	2.10c. to 2.15c.
No. 13, del'd Philadelphia	2.29c. to 2.34c.
No. 13, blue annealed' B'ham	2.15c. to 2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Fittsburgh	2.25c.
No. 24, f.o.b. Chicago dist. mill	2.35c.
No. 24, del'd Philadelphia	2.54c.
No. 24, f.o.b. Birmingham	2.40c. to 2.50c.
No. 24, c.i.f. Pacific Coast ports	3.00c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.50c.

Galvanized

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	2.90c. to 3.00c.
No. 24, del'd Cleveland	3.08½c.
No. 24, del'd Philadelphia	3.24c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, c.i.f. Pacific Coast ports	3.50c.

Continuous Mill Sheets

No. 10 gage	1.70c. to 1.75c.
No. 13 gage	1.85c. to 1.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 28, f.o.b. Chicago dist. mill	2.65c. to 2.75c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.10c. to 3.20c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill:	
Unassorted	3.15c.
Seconds	3.25c.
Primes only	3.35c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.70c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1¼-1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
25 0	5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ⅗c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton

Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

Base per 100 Lb.

Spikes, ⅜ in. and larger	$2.70
Spikes, ½ in. and larger	2.70
Spikes, boat and barge	$2.90
Tie plate, steel	1.95
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18
			Lap Weld		
2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅛	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ in. to 1½ in.	53	3¼ in. to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Scrap Freight Rates Reduced in East

Freight rates on iron and steel scrap from New York and Brooklyn and from Jersey City, Newark and Harrison to eastern Pennsylvania points and Claymont, Del., are to be reduced on April 27 by the Pennsylvania Railroad, on May 4 by the Lehigh Valley Railroad and May 15 by the Central Railroad of New Jersey.

Under the new schedule, the rate to such consuming points as Coatesville and Phoenixville, Pa., and Claymont, Del., from New York and Brooklyn will be reduced from $3.53 to $3.41 a ton, and the rate from from Jersey City, Newark and Harrison will be reduced from $2.90 to $2.65. The new rate to Philadelphia, Conshohocken and Pencoyd from New York and Brooklyn will be $3.06 instead of $3.53 and from Jersey City, Newark and Harrison $2.30 instead of $2.65.

The present rate of $3.78 a ton on shipments from New York and Brooklyn to Harrisburg or Steelton will be reduced to $3.51 and from Jersey City, Newark and Harrison to $2.75 from $2.90. The new schedule of rates is as follows:

	New York, Brooklyn, Long Island City		Jersey City, Harrison, Newark, New Brunswick	
To	New Rate	Present Rate	New Rate	Present Rate
Bristol	$3.06	$3.53	$2.30	$2.65
Tacony	3.06	3.53	2.30	2.65
Bridesburg	3.06	3.53	2.30	2.65
Philadelphia	3.06	3.53	2.30	2.65
Swedeland	3.06	3.53	2.30	2.65
Coatesville	3.41	3.53	2.65	2.90
Parkesburg	3.41	3.53	2.65	2.90
Lancaster	3.51	3.78	2.75	2.90
Columbia	3.51	3.78	2.75	2.90
Middletown	3.51	3.78	2.75	2.90
Harrisburg	3.51	3.78	2.75	2.90
Steelton	3.51	3.78	2.75	2.90
Pencoyd	3.06	3.53	2.30	2.65
Conshohocken	3.06	3.53	2.30	2.65
Ivy Rock	3.06	3.53	2.30	2.65
Norristown	3.41	3.53	No change	
Phoenixville	3.41	3.53	2.65	2.90
Spring City	3.41	3.53	2.65	2.90
Pottstown	3.41	3.53	2.65	2.90
Stowe	3.41	3.53	2.65	2.90
Birdsboro	3.41	3.53	2.65	2.90
Reading	3.41	3.53	2.65	2.90
Auburn	3.41	3.53	2.65	2.90
Pottsville	3.41	3.78	2.65	2.90
Eddystone	3.41	3.53	No change	
Chester	3.41	3.53	No change	
Claymont, Del.	3.41	3.53	No change	
Lebanon	3.51	3.78	2.75	2.90

▲▲▲

Valuable Tin Deposits Reported in Argentina

Deposits of tin, recently discovered in northwestern Argentina, are described by the president of the Argentine Minerals Society, who has returned from an inspection tour, as being of positive economic importance, according to Argentine information forwarded to the Department of Commerce by Trade Commissioner M. T. Houghton at Buenos Aires.

The newly discovered veins in the zone adjacent to Tinogasta in Catamarca, are reported to be quite extensive, of considerable depth and are said to contain 2 to 15 per cent oxide of tin. It is considered that the exploitation of these deposits would be of considerable importance if it were possible to work them on an economical basis. At present, with mineral prices low and no facilities available for transportation, there is little likelihood of immediate exploitation. It is the intention of the society, however, to attempt to interest the government in construction of roads and hydraulic works with a view to developing these deposits.

▲▲▲

Production of Zinc Declined in 1930

Production of primary refined zinc in the United States from ores of domestic origin in 1930 amounted to 489,361 net tons, compared with 612,136 tons in 1929, according to the United States Bureau of Mines. Production from foreign sources was 8684 tons, compared with 13,311 tons in 1929. In addition to the output of primary zinc, 34,849 tons of redistilled secondary zinc was produced, compared with 47,348 tons in 1929.

Of the total output of 532,894 tons, 366,857 tons was distilled primary zinc, 131,188 tons was electrolytic zinc, and 34,849 tons was redistilled secondary zinc. In 1929 the total production of 672,795 tons was made up of 469,212 tons of distilled primary zinc, 156,235 tons of electrolytic zinc and 47,348 tons of redistilled secondary zinc. The 1930 output was composed of 156,494 tons of high grade zinc, 26,079 tons of intermediate, 93,270 tons of select and brass special, and 257,051 tons of prime Western zinc.

▲▲▲

National Steel Issues $40,000,000 Bonds

The National Steel Corpn. has floated a $40,000,000 issue of first mortgage sinking fund gold bonds through a banking syndicate. Proceeds from the sale of the bonds will be applied chiefly to the retirement of the entire outstanding bonded indebtedness of the corporation and its constituent companies and to the discharge of current obligations incurred in the construction of the plant of the Great Lakes Steel Corpn. at Detroit, and the acquisition of the Michigan Steel Corpn., Detroit. The balance will be used as additional working capital.

▲▲▲

The new $500,000 mechanical engineering building at the University of Wisconsin will be formally dedicated on Monday, June 22, Commencement Day. A general reunion of engineering graduates is planned.

Public Works Contracts $57,296,787 in Week

WASHINGTON, April 14.—Contracts for public and semi-public construction amounting to $57,296,787 were awarded during the past week, according to reports received by the public works section of the President's Committee for Employment, it was announced by Col. Arthur Woods, chairman. The total of all contracts reported now stands at $1,084,020,104.

"Accelerated public works programs are contributing to increased business throughout industries related to the construction field," said Colonel Woods. "Recent reports show that fabricated steel orders have reached another high weekly figure. Tonnage lettings since the first of this year total 943,000 tons, against 423,000 for the same period of 1930 and 558,000 for the same period of 1929."

▲▲▲

550 Tons of Wire Mesh Awarded for Road

WASHINGTON, April 14.—The Hudson-Dougherty Co., Washington jobber, has been given a contract to supply 550 tons of wire mesh for the 120-ft. highway to be built between Washington and Mount Vernon, the largest award of the kind ever made in this section.

▲▲▲

Rustless Steel Nails Have Long Life

Acid-resistant nails have proved a source of economy in the Bisbee, Ariz., mine of the Phelps-Dodge Corpn. Water carried in a wooden flume in the mining operations contained a relatively high acid percentage, so high that ordinary steel nails corroded quickly and frequent replacement was necessary to keep the flume intact.

About 15 months ago the Phelps-Dodge organization adopted alloy nails for this purpose. An engineer of the company reported recently that these nails were still in excellent condition. The alloy of which they were made is a 12 to 16 per cent chromium iron.

▲▲▲

The annual spring meeting of the American Refractories Institute will be held at the Greenbrier Hotel, White Sulphur Springs, W. Va., on May 25 and 26. Dorothy Texter, Oliver Building, Pittsburgh, is secretary.

▲▲▲

American Steel & Wire Co. has purchased the business and smelting plant of the Edgar Zinc Co., Cherryvale, Kan. The Edgar company is one of the oldest and largest zinc smelters in the Southwest territory.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper Firm at 10c., Delivered—Zinc at a New Low

NEW YORK, April 14.

THE WEEK'S PRICES, CENTS PER POUND FOR EARLY DELIVERY

	Apr. 14	Apr. 13	Apr. 11	Apr. 10	Apr. 9	Apr. 8
Lake copper, New York	10.12½	10.12½	10.12½	10.12½	10.12½	10.12½
Electrolytic copper, N. Y.*	9.75	9.75	9.75	9.50	9.50	9.50
Straits tin, spot, N. Y.	25.60	25.50	....	25.62½	25.87½	25.62½
Zinc, East St. Louis	3.80	3.85	3.85	3.85	3.90	3.90
Zinc, New York	4.15	4.20	4.20	4.20	4.25	4.25
Lead, St. Louis	4.25	4.25	4.25	4.25	4.25	4.25
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

COPPER

Despite the fact that some sales of electrolytic copper were made about a week ago at 9.50c. a lb., delivered, the market has now become firmly established at 10c. Not a great deal of metal was sold at the low figure, and few of the large producers took orders at that price. They now feel that their firm attitude at a time when fresh price weakness seemed inevitable has saved the market from further demoralization. Their position has been fortified by the monthly report on copper statistics, which revealed a decline in the daily rate of production to 3292 tons from 3566 tons in February and 3305 in January, and a drop in total stocks of 13,837 tons, of which 9424 tons was refined copper and 4413 tons was blister. Total stocks at the end of March were 553,016 tons, compared with 566,853 at the end of February. Sales are not large, but shipments of some producers are now about equal to output. Foreign sales thus far in April have been about 10,000 tons, of which 3500 tons was sold yesterday and today at 10.30c. c.i.f. European ports.

LEAD

Dullness continues, but prices are firm at 4.25c., St. Louis, or 4.50c., New York. Present indications are that sales this month will not be any better than those during March. In the East an occasional lot has sold as low as 4.45c., New York, but only a little metal is available at the concession. Statistics for March are expected this week and may show a moderate increase in surplus stocks. There is disappointment in the failure of producers to agree on proposed restrictions in output.

TIN

The tin market has been exceedingly quiet all week except for one active day, April 8, when about 750 tons changed hands, dealers and consumers both having been buyers. Sales were made for all positions. Interest in the market centers in the continuation of efforts toward restriction of production. A report that the Malay government has joined with other producing countries in a production limitation program has attracted attention, though factors here are inclined to believe that there will be little immediate effect marketwise. Prices here during the week have been within a narrow range, from 25.50c. a lb. to 25.87½c. Today's price was 25.60c. London prices today were £115 12s. 6d. for spot standard, £117 2s. 6d. for future standard, and £118 2s. 6d. for spot Straits, with the Singapore price at £118. Stocks in London were 27,285 tons, an increase of 291 tons in the week. Shipments up to April 11 from the Straits were 2520 tons.

ZINC

Statistics for March showed a decrease of 2896 tons in stocks of all grades of zinc. Despite this favorable showing, further weakness in prime Western zinc has developed and the metal was available today at 3.80c. a lb., East St. Louis, with indications that 3.75c. might be accepted. This is the lowest level in many years, the previous recent low point having been 3.95c. The break in prices has been a distinct surprise to several of the leaders in the industry who have been conversant with its history for many years. The favorable aspect is that the low prices may stimulate demand. The New York price is 4.15c. a lb.

ANTIMONY

Chinese antimony for prompt shipment is quoted in the New York market at 6.90c. a lb., duty paid.

NICKEL

Electrolytic cathodes are quoted at 35c. a lb., with shot and ingot made from remelted electrolytic at 36c. a lb. for single lots of spot metal.

ALUMINUM

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	17.25c.
*Copper, hot rolled, base sizes	19.87½c.
Seamless Tubes—	
Brass	20.12½c.
Copper	22.37½c.
Brass Rods	15.50c.
Brazed Brass Tubes	25.12½c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	28.00c. to 29.00c.
Tin, bar	30.00c. to 31.00c.
Copper, Lake	11.25c. to 11.75c.
Copper, electrolytic	11.00c. to 11.50c.
Copper, casting	10.75c. to 11.25c.
Zinc, slab	5.50c. to 6.50c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	7.50c. to 8.50c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	24.00c. to 25.00c.
Alum. ingots, No. 12 alloy	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	19.00c. to 20.00c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	31.00c.
Tin, bar	33.00c.
Copper, Lake	11.13c.
Copper, electrolytic	11.13c.
Copper, casting	10.63c.
Zinc, slab	5.50c.
Lead, American pig	5.25c. to 5.40c.
Lead, bar	8.00c.
Antimony, Asiatic	10.50c.
Babbitt metal, medium grade	15.75c.
Babbitt metal, high grade	35.00c.
Solder, ½ and ½	20.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.00c.	9.00c.
Copper, hvy. and wire	7.75c.	8.75c.
Copper, light and bottoms	6.75c.	7.50c.
Brass, heavy	4.50c.	5.50c.
Brass, light	3.75c.	4.75c.
Hvy. machine composition	6.75c.	7.50c.
No. 1 yel. brass turnings	5.00c.	5.50c.
No. 1 red brass or compos. turnings	6.50c.	7.25c.
Lead, heavy	3.25c.	3.75c.
Lead, tea	2.00c.	2.50c.
Zinc	1.75c.	2.25c.
Sheet aluminum	10.00c.	12.00c.
Cast aluminum	5.00c.	7.50c.

Reinforcing Steel

Awards in Larger Volume—Inquiries Lighter

LETTINGS of reinforcing steel the past week totaled 5350 tons, compared with 3850 tons the previous week. With the exception of 2000 tons for a bridge at Somers Point, N. J., and 600 tons for a veterans' hospital at Waco, Tex., awards were mostly in small tonnages. New business, at 3200 tons, was lighter than a week ago and includes no large-sized tonnage. About 1500 tons will be used in the East St. Louis approach to the St. Louis municipal bridge. Awards follow:

NEW YORK, 254 tons of bars and 500 tons of steel trusses for Kill van Kull bridge, to Truscon Steel Co.

SOMERS POINT, N. J., 2000 tons, bridge, to McClintic-Marshall Corpn.

ESSEX COUNTY (N. J.) PARK COMMISSION, 180 tons, storm water conduit, to Igoe Brothers.

PITTSBURGH, 100 tons, Knoxville Junior High School, to Metzger-Richardson Co.

WASHINGTON, 150 tons, Palais Royal warehouse, to Rosslyn Steel & Cement Co., Rosslyn, Va.

STATE OF ILLINOIS, 300 tons, road and culvert work, to Joseph T. Ryerson & Son, Inc.

STATE OF ILLINOIS, 200 tons, road work, 200 tons to Concrete Engineering Co. and 100 tons to Olney J. Dean & Co.

CHICAGO, 150 tons, superstructure for Randolph Street viaduct, to an unnamed bidder.

WACO, TEX., 600 tons, United States Veterans' Hospital, to Laclede Steel Co.

PORTLAND, ORE., 175 tons, bridge over Cape Creek, Lane County, to an unnamed bidder.

PORTLAND, 500 tons, Gold Beach bridge over Rogue River, to unnamed company.

PORTLAND, 285 tons, four bridges in Lane County, to an unnamed company.

PASADENA, CAL., 200 tons, laboratory for California Institute of Technology, to an unnamed bidder.

SACRAMENTO, 248 tons, paving work in San Diego County, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

LYNN, MASS., 150 tons, telephone exchange.

PROVIDENCE, R. I., 150 tons, telephone exchange.

NEW YORK, 217 tons, underpass at Linden Boulevard for Board of Transportation; Michael Di Micco, New York, low on general contract.

STATE OF NEW JERSEY, 1500 tons, highway construction, route 2, section 6; George M. Brewster, Bogota, N. J., low on general contract.

HARRISBURG, PA., 100 tons, city sewage system.

WASHINGTON, 400 tons, hydraulic laboratory for Bureau of Standards; Stoffelt & Tilliston Co., Philadelphia, general contractor.

WASHINGTON, 220 tons, Pennsylvania Railroad tunnel under Arlington Memorial Bridge; J. H. Coleman, Clarendon, Va., low bidder on general contract.

LANSING, MICH., 100 tons, bank and office building.

ANN ARBOR, MICH., 100 tons, Hutchins Hall, at University of Michigan.

MUSKEGON HEIGHTS, MICH., 110 tons, sewage disposal plant.

WINNETKA, ILL., 175 tons, filtration plant.

CHICAGO, 150 tons, Wells public school; plans revived.

CHICAGO, 150 tons, Humbolt Park Station for Commonwealth Edison Co.

ST. LOUIS, 1015 tons, East St. Louis approach to St. Louis municipal bridge; Moore Brothers Construction Co., East St. Louis, general contractors.

HARVEY, LA., 3500 tons, locks for United States Government; C. F. Lytle, Sioux City, Iowa, general contractor.

SEATTLE, 142 tons, factory, Eighth and Spokane Streets; bids being taken.

SACRAMENTO, 108 tons, bridge over Ell River, Mendocino County; bids April 29.

▲ ▲ ▲

Automotive Group Plans Production Meeting

A comprehensive technical program has been arranged by the Milwaukee section of the Society of Automotive Engineers for the production meeting to be held at the Hotel Schroeder, Milwaukee, May 7 and 8.

"Nickel Alloys in Automotive Manufacturing," by T. H. Wickenden, International Nickel Co., and "Use of Power Driven Industrial Trucks in the Handling Systems of Automotive and Accessory Plants," by C. B. Crockett, Industrial Truck Association, will feature the opening session, May 7.

"New Developments in Surface Hardening Steel and Their Effect on Production Cost," by H. E. Koch, Hevi-Duty Electric Co., and "Latest Developments in High-Speed Milling with Tantalum and Tungsten-Carbide Cutters," by F. W. Curtis, Kearney & Trecker Corpn., are papers planned for the morning and afternoon respectively of May 8. Each of these papers will be followed by demonstrations at the plant of the company with which the author is connected.

At the dinner, planned for Friday evening, Dr. Glenn Frank, president, University of Wisconsin, will speak on "Aspects of Economical Production as They Affect Present Conditions." H. L. Horning, president, Waukesha Motor Co., will be toastmaster.

▲ ▲ ▲

Shipments of railroad locomotives in March totaled 10 units, equally divided between the steam and the electric types, according to reports received by the Bureau of the Census from the principal manufacturing plants. Unfilled orders at the end of March consisted of 95 locomotives, of which 93 were steam locomotives, 12 for foreign shipment. Shipments in February consisted of 15 locomotives.

Metal Airplanes Adapted to Mass Production

The greater adaptability of the metal airplane to mass production methods was emphasized by F. M. Smith, vice-president and general manager of the Buckley Aircraft Co., Wichita, Kan., at a recent meeting of the Wichita section of the Society of Automotive Engineers.

"Only about one-third of the floor space and one-eighth of the machinery is required for metal construction that is needed for wood-fabric, and still less machinery will be needed as the mills increase the variety of their dies and extruding forms for duralumin," Mr. Smith said.

"Virtually all of the skilled mechanics needed in a factory which specializes in duralumin construction are sheet-metal workers, while a great variety of trades is necessary in a factory in which planes of the conventional type are manufactured."

In discussing materials, Mr. Smith pointed out that in the future magnesium and beryllium would have a place. Static tests on structural shapes made from Allegheny metal were said to show an advantage in strength per pound of structure; and the spot-welded connections show a notable tenacity, a joining having three spot-welds equaling in strength one made with five rivets.

"Duralumin construction has not been developed to the maximum, but definite figures are available as to its strength," he continued. "Unquestionably duralumin lends itself to production more than does any other metal possessing anywhere nearly equal strength characteristics."

▲ ▲ ▲

Railroad Equipment

Great Northern has ordered 500 steel hopper cars from Siems-Stembel Co., division of Standard Steel Car Co.

Minneapolis & St. Louis has ordered 100 flat cars from General American Car Co. and four gas-electric cars from St. Louis Car Co.

General American Tank Car Corpn. will build 300 cars in its own shops for leasing.

▲ ▲ ▲

Concrete Engineering Co., Omaha, Neb., has opened a new warehouse between Minneapolis and St. Paul, Minn., to serve that district in the distribution of sheet steel, copper sheets and tubing, terne plate, metal roofing products, fencing, nails and wire, steel posts and gates and metal building materials.

▲ ▲ ▲

Makers of nails and spikes not produced in rolling or wire mills sold $6,615,000, or 50.8 per cent of their total 1929 production of $13,017,000, direct to industrial consumers, according to the Bureau of the Census.

FABRICATED STRUCTURAL STEEL

Awards of 55,000 Tons Include Express Highway and Philadelphia Subway—New Projects Are 22,500 Tons

AWARDS of fabricated structural steel this week totaling about 55,000 tons compare with 41,500 tons a week ago. Included are 16,000 tons for an express highway over the Hackensack and Passaic Rivers in New Jersey, 9250 tons in a section of Philadelphia subway, 10,000 tons for a Post Office in Boston and 2000 tons in an office building at White Plains, N. Y.

March awards of fabricated structural steel in the New York district, exclusive of subway and bridge construction, totaled 159,044 tons, according to the Structural Steel Board of Trade, New York. This consisted largely of two projects, the Metropolitan Square Development, requiring 125,000 tons, and the Metropolitan Life Insurance Co. building, 20,000 tons, leaving only 14,044 tons for all other construction, compared with 13,641 tons in February.

New projects this week total only 22,500 tons, compared with 128,000 tons a week ago, when two large Chicago inquiries were reported. This week's new business includes 5000 tons in a 38-story apartment building in Chicago, 2000 tons in an auditorium for St. Paul, Minn., and 1000 tons in State armories at Newburgh and Kingston, N. Y. Awards follow:

North Atlantic States

BOSTON, 10,000 tons, Post Office, to McClintic-Marshall Corpn.

SPRINGFIELD, MASS., 850 tons, Post Office, to Palmer Steel Co.

ANSONIA, CONN., 500 tons, brass mill, to American Bridge Co.

PEMBROKE-ALLENTOWN, N. H., 330 tons, State bridge, to Kitteridge Bridge Co.

EVERETT, MASS., 160 tons, chemical plant unit, to Boston Structural Steel Co., Inc.

BOOTHBAY, ME., 150 tons, State bridge, to Kitteridge Bridge Co.

BRIDGEPORT, CONN., 100 tons, receiving and storage building for Mitchell Dairy Co., to Porcupine Co.

WHITE PLAINS, N. Y., 2000 tons, office building, to Hinkle Iron Works.

BRENTWOOD, N. Y., 1020 tons, State hospital, to E. Slacht & Son.

STATE OF NEW JERSEY, 16,000 tons, elevated highway across Hackensack River, to Phoenix Steel Co.

SOMERS POINT, N. J., 825 tons, bridge, to McClintic-Marshall Corpn.

PHILADELPHIA, 9250 tons, subway section, to American Bridge Co.

WASHINGTON, 1465 tons, Connecticut Avenue bridge, to McClintic-Marshall Corpn.

The South

CHARLOTTESVILLE, VA., 135 tons, law building for University of Virginia, to Richmond Structural Steel Co.

WEST VIRGINIA NORTHERN RAILROAD, 280 tons, bridges, to Virginia Bridge & Iron Co.

RITCHIE COUNTY, W. VA., 340 tons, three bridges, to Pittsburgh-Des Moines Co.

CHARLESTON, W. VA., 400 tons, four barges for West Virginia Sand & Gravel Co., to Midland Barge Co.

BATON ROUGE, LA., 1055 tons, Black River Bridge for Louisiana Highway Commission, to Nashville Bridge Co.

LAUREL, MISS., Masonite Corpn., 200 tons, to Ingalls Iron Works.

Central States

DETROIT, 2500 tons, Board of Water Control, Springwell Station, to Whitehead & Kales Co.

BIG FOUR RAILROAD, 250 tons, two bridges to Mount Vernon Bridge Co.

SAINT MEINRAD, IND., 335 tons, seminary building, to Mesker Co.

EAST CHICAGO, IND., 500 tons, Sag Canal bridge, to American Bridge Co.

CHICAGO, 210 tons, interior work for Fine Arts Building, to Midland Structural Steel Co.

CHICAGO, 100 tons, Railway Express Agency, to Vierling Steel Works.

CHICAGO, 150 tons, substation for Commonwealth Edison Co., to Joseph T. Ryerson & Son, Inc.

PALOS PARK, ILL., 450 tons, highway bridge, to American Bridge Co.

MARQUETTE, MICH., 650 tons, ore dock for Soo Line, to McClintic-Marshall Corpn.

WAUSAU, WIS., 250 tons, Eau Claire River bridge, to Wausau Iron Works.

WEBSTER GROVES, MO., 250 tons, girder span for Missouri Pacific Railway, to McClintic-Marshall Corpn.

Western States

CHEYENNE, WYO., 250 tons, State bridge in Johnson County, to an unnamed bidder.

Canada

OTTAWA, ONT., 500 tons, addition to St. Patricks College, to Dominion Bridge Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

MEDFORD, MASS., 600 tons, college building.

BOSTON, 250 tons, Morton Street bridge.

MANCHESTER, CONN., 120 tons, library and Y. M. C. A. building.

NEW HAVEN, CONN., 900 tons, administration building for Sheffield Scientific School, Yale University, previously reported as 300 tons.

NEW HAVEN, 1000 tons, hospital building.

RUTLAND, VT., 200 tons, Post Office.

STATE OF NEW YORK, 1000 tons, armories at Newburgh and Kingston.

STATE OF NEW YORK, 900 tons, highway bridges; bids taken April 14.

STATE OF NEW JERSEY, 500 tons, highway bridges.

READING, PA., 2000 tons, Berks County Court House.

NEW YORK, 400 tons, garage building, Christopher and Barrow Streets.

NEW YORK, 400 tons, garage building in Bronx.

NEW YORK, 800 tons, gymnasium building for Hunter College.

OSSINING, N. Y., unstated tonnage, laundry and bath building for prison.

FARMINGDALE, N. Y., 100 tons, infirmary for Nassau County Hospital.

HOBOKEN, N. J., 200 tons, Post Office.

VERONA, N. J., 200 tons, staff building for hospital.

JERSEY CITY, N. J., 500 tons, gymnasium building for Dickinson High School; Henry Auf der Heide, West New York, N. J., low bidder on general contract.

The South

HARVEY, LA., 1500 tons, piling for locks for United States Government, C. F. Lytle, Sioux City, Iowa, general contractor.

Central States

TOLEDO, 400 tons, garage for Port Toledo Building Co.

CLEVELAND, unstated tonnage, several buildings and 23 storage tanks for Gulf Refining Co.

DETROIT, 115 tons, repair to Southfield sewer.

CHICAGO, 5000 tons, 38-story apartment building.

SIOUX FALLS, S. D., 400 tons, Post Office.

ST. PAUL, MINN., 2000 tons, auditorium.

MILWAUKEE, 1500 tons, Medical Arts Building; Russell Barr Williamson, 707 North Broadway, architect.

MONROE, WIS., 125 tons, State highway bridges; bids close April 21.

Western States

SPOKANE, WASH., 400 tons, high school.

LOS ANGELES, 750 tons, auto sales building, Wilshire and Mariposa Avenues; bids being taken.

SACRAMENTO, 303 tons, bridge over Eel River, Mendocino County; bids April 29.

SACRAMENTO, 198 tons, bridge over Clear Creek, Shasta County; bids April 29.

Canada

HAMILTON, ONT., 1500 tons, bridge over C. N. R. tracks at western entrance to city, for City Council.

Bermuda

HAMILTON, 500 tons, Princess Hotel.

▲ ▲ ▲

Rust Engineering Co., Pittsburgh, has received a contract for the construction of a double-fired, continuous billet heating furnace from the Great Lakes Steel Corpn., Detroit. This continuous furnace, which will serve the new No. 2 merchant mill now being installed at the Great Lakes plant, will have a capacity of 40 gross tons per hr. while heating 30-ft. billets from 2 x 2 in. to 4 x 4 in.

▲ ▲ ▲

Jones & Laughlin Steel Corpn. has placed an order with the Rust Engineering Co., Pittsburgh, for two zone-controlled, double-fired continuous billet heating furnaces. These furnaces will each have a capacity of 40 gross tons per hr. while heating billets of 4 x 4 in. to 6 x 6 in. and 16 ft. 6 in. long.

Reorganization of British Steel Plants Urged to Eliminate Weak Mills

▲▲▲

(*By Cable*)

LONDON, ENGLAND, April 13.

PRESIDENT GRAHAM of the Board of Trade stated recently that it is impossible to admit that all British iron and steel ills can be cured by a tariff. Inquiry has shown that no real agreement in industry is possible, such as would be necessary to form a tariff, and that it is impracticable to prohibit the entire 3,000,000 tons of steel imports, as numerous intermediate industries would be affected, and foreign countries might adopt other tariff measures detrimental to British industry.

He stated that he believed in drastic reorganization to dispose of weak and redundant units.

The Polish steel group Kattowitzer Bismarckhütte Vereinigte Königs und Laurahütte is reported to have booked a Soviet order for 240,000 tons of steel bars, shapes, plates and sheets. The Friedenshütte has booked 16,000 tons of steel, also for Russia.

Output of the U. S. S. R. in March was 290,000 tons of pig iron, or only 70 per cent of the program. Steel production was 285,000 tons, or 66 per cent of the schedule.

The Soviet Union has now decided to invest this year 6,270,000,000 rubles in the heavy steel trades compared with the proposed 5,500,000,000 rubles.

Pig iron inquiry is improving, but business is still generally poor. Wages of Cleveland blast furnace workers have been reduced 2.25 per cent, but pig iron prices are unchanged, and no further concessions are expected.

Polish mills book 240,000 tons of bars, shapes, plates and sheets for Soviet.

* * *

Welsh tin plate agreement faces failure, one group of mills having withdrawn and another planning to terminate agreement in June.

* * *

Japan plans aluminum plant in Chosen to have 10,000-ton annual capacity.

* * *

British erect three-story steel structure to test fabricated material.

▼▼▼

Finished steel is quiet, and certain mills have restarted with difficulty.

Swan, Hunter, Wigham, Richardson, Ltd., has received an order for a 7000-ton oil tank ship from the Burma Oil Co., the first new ship order placed with a Tyne yard this year. Shipbuilding is otherwise quiet.

Export steel demand is slightly improved, especially Canadian buying, and domestic railroad and structural steel orders are supplementing the tonnage on mill order books.

The Continent reports sustained activity from India and China in finished material, enabling mills to maintain export prices, as output is greatly restricted.

British consumers are displaying but little interest in buying, except for prompt shipment of small lots.

The Welsh tin plate industry is possibly approaching a crisis. One group of mills has withdrawn from the pooling plan and another is terminating its agreement in June.

Mills are meeting on Tuesday, when it is expected that the future of the Conference will be decided. If the conference fails, a rapid decline in values is expected, although current price levels are in many instances below cost.

Certain consumers have been attracted and sales have been made up to the end of the year, at 15s. to 15s. 6d. ($3.65 to $3.77) per base box f.o.b. works port. Certain sellers have shaded 15s. ($3.65), while others are quoting up to 16s. ($3.89) per base box.

Galvanized sheets are generally unchanged although certain small Indian business has been secured. Many mills, however, have not yet reopened after the holidays. Black sheets continue quiet.

The South African Iron & Steel Industrial Corpn. needs £1,250,000 ($6,075,000) to tide over the current financial year. No public appeal is to be made, but the Government is expected to take up 3,000,000 Class B shares, authorized by an Act, in addition to

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.8665 (par).

British Prices, f.o.b. United Kingdom Ports

Ferromanganese, export.	£9	0s.	to	£11	5s.	$43.74	to	$54.75
Billets, open-hearth.....	5	5	to	5	10	25.52	to	26.76
Black sheets, Japanese specifications	10	10				51.03		
Tin plate, per base box..	0	15	to	0	15½	3.65	to	3.77
						Cents a Lb.		
Steel bars, open-hearth..	7	17½	to	8	7½	1.71	to	1.81
Beams, open-hearth.....	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth...	7	12½	to	8	2½	1.66	to	1.76
Angles, open-hearth.....	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	8	10				1.84		
Galvanized sheets, No. 24 gage	11	0				2.42		

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	9s.	to	£2	10s.	$11.90	to	$12.15
Billets, Thomas (nominal)	£3	10s.	to	£3	11s.	$17.01	to	$17.25
Wire rods, low C., No. 5 B.W.G.	5	2½	to	5	7½	24.94	to	26.15
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese.....	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant....	3	17	to	3	19	0.83	to	0.85
Beams, Thomas, British standard (nominal)...	3	10	to	3	12½	0.78	to	0.80
Channels, Thomas, American sections.....	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	16	to	3	17	0.82	to	0.83
Angles, Thomas, 3-in....	3	18	to	3	19	0.84	to	0.85
Hoop and strip steel over 6-in. base	4	7½				0.94		
Wire, plain, No. 8 gage..	5	0				1.10		
Wire, barbed, 4-pt. No. 12 B.W.G.	9	0				1.91		

500,000 Class A shares now held under the name of the Governor General's Council.

French output in February was 726,000 tons of pig iron and 693,000 tons of raw steel.

Luxemburg mills sold about 35,000 tons of steel bars at the end of March, the first large tonnage business placed for some weeks.

▲▲▲

British Test Structural Steel Building

LONDON, ENGLAND, April 4.—Large scale tests of fabricated structural steel in a building are in progress at Watford, England, where the British Department of Scientific and Industrial Research has its building research station. In cooperation with the British Steel Works Association, a three-story skeleton steel structure has been erected for these tests.

The skeleton building is 16 x 32 ft., erected from steel shapes taken from stock, and is typical of the structural steel frames in modern British construction, except that it has no roof, walls, floors or stairs. Nothing is attached to the steel structure but a set of tanks 2 ft. 9 in. in diameter and 6 ft. deep. Three such tanks are on each beam, and pipes running to a pump permit filling the tanks with loads up to one ton of water. Recording instruments will show the effect of these loads on different parts of the structure. As the structure has been erected by riveting, bolting and welding, interesting comparisons will be obtained.

▲▲▲

Japan Resumes Steel Imports from Europe

HAMBURG, GERMANY, April 1.—Japanese consumers have recently resumed buying on a larger scale than at any time this year. In the past week more than 5000 tons of wire rods have been booked for shipment to Japan by German mills, compared with a total of about 7000 tons since Jan. 1. The average price of the wire rods just placed was £5 ($24.30) a ton, c.i.f. Japanese port. There has also been some business with Japan in tubing, light gage black sheets, hoops and structural steel. About 5000 tons of semi-finished material has been purchased by Japanese users in the past week.

▲▲▲

An exhibit of new research apparatus and devices in the field of applied mechanics will feature the first national meeting of the applied mechanics division of the American Society of Mechanical Engineers, at Purdue University, June 15-17.

Soviet Manganese Ore Output Record in 1930

WASHINGTON, April 7.—Production of manganese ore in the U. S. S. R. in the year ended Sept. 30, 1930, reached a record of 1,444,166 metric tons of concentrated ore, compared with 1,183,880 tons in the preceding fiscal year and 1,245,274 tons in 1913, according to Soviet Government information received by the Department of Commerce. Exports totaled 874,518 tons in the fiscal year, 1929-1930, compared with 889,969 tons in 1928-1929 and 1,192,790 tons in 1913. With the general expansion of the metal industry of the Soviet union, says the report, a considerable increase in domestic consumption of manganese ore has occurred.

▲▲▲

Steel Cartel to Fix Export Quotas

WASHINGTON, April 10.—The Continental Steel Cartel at a meeting in Paris, March 26, agreed to a proposal by the Belgian-Luxemburg representatives to regulate exports of the various groups on the basis of export tonnage quotas, says a report to the Department of Commerce.

▲▲▲

Must Reduce Production Costs 30%, Say British

WASHINGTON, April 14.—A memorandum has been published by the Federation of British Industries, says a report to the Department of Commerce, setting forth the reforms considered necessary for a revival of British trade: First, the establishment of a fiscal system which will combine the protection of British interests, with the widest possible extension of inter-Empire preference, and, second, reduction in the burden of taxation and other charges borne by industry.

To establish a fiscal system giving inter-Empire preference, the Federation urges emergency action as soon as a government is in power which is prepared to adopt a policy of protection. Construction of a tariff should be entrusted to a tariff board of a permanent and executive character. On production costs, the federation emphasizes the need of economies up to 30 per cent.

▲▲▲

European Freight Rates Reduced to Far East

HAMBURG, GERMANY, April 1.—Following the recent report that Japanese competition for Far Eastern business has brought about a decision to reduce drastically freight rates from European ports, one of the leading steamship companies in the Netherlands has cancelled its conference agreement. The new rates quoted by shipping lines operating to the Far East permit c.i.f. prices on steel products about 5s. ($1.22) a ton lower than formerly.

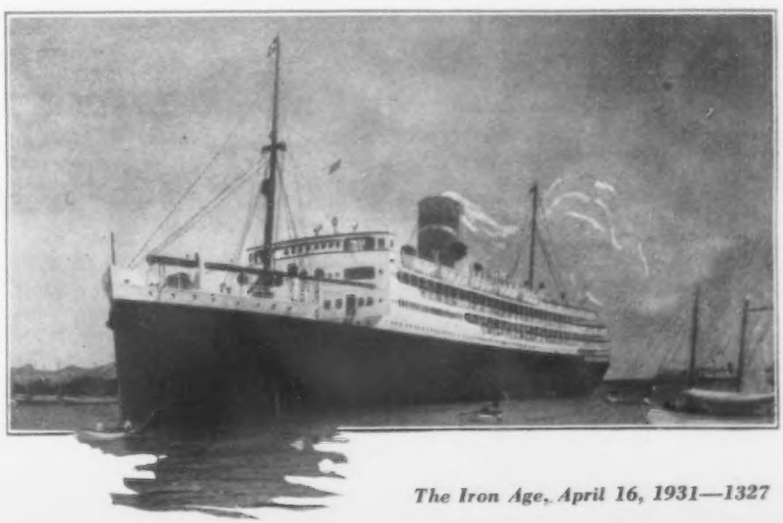
▲▲▲

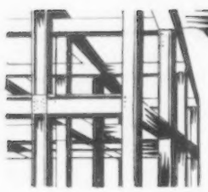
Japan to Build 10,000-Ton Aluminum Works

HAMBURG, GERMANY, April 1.—An inquiry is in the market here from Japan for machinery and equipment required in an aluminum plant on the Yalu River in Chosen, which will have an annual capacity of 10,000 tons. Negotiations for the equipment are being carried out by a Japanese Government representative who is in Germany at present.

▲▲▲

Marion Steam Shovel Co., Marion, Ohio, has received a $300,000 order for six large shovels for shipment to Soviet Russia.





PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Outlook Uncertain

Doubt as to Prospects for Important Recovery Before the Fall

MACHINE tool business has shown no further gains in April, and in some instances it appears that sales this month may not equal those of March. In such circumstances, the trade has quite generally come to the conclusion that no important recovery is to be expected before fall, considering that the usually dull summer months are so near at hand.

While domestic business is virtually without feature, there is interest in the prospective purchases of the Amtorg Trading Corpn. for Soviet Russia, notwithstanding the fact that many machine tool builders still decline to meet Amtorg's long-term credit terms. Amtorg is in the market for a large amount of equipment for the Autostroy automobile plant, its requirements including 60 automatic machines and a considerable number of milling and grinding machines and miscellaneous tools. Following the purchase of this equipment, Amtorg will be in the market for a list of tools for a ball and roller bearing plant in Russia.

Efforts of machine tool builders in their sales campaigns are being centered on the replacement of obsolete equipment to the end that unit production costs for manufacturers may be reduced. One obstacle to the immediate success of this program, however, is that boards of directors or other executives of most companies are keeping a close check on capital expenditures even when possible economies are admitted, and another is that many organizations are doing all in their power to give employment to as many persons as they can and hesitate to put in equipment that will give greater production with less man hours. It is believed, however, that this is the time to stress the advisability of replacing obsolete machinery even though concrete results may not be achieved for some months.

▲ ▲ ▲

NEW YORK

Machine tool sales thus far in April have barely held to the average volume of March. In fact, some dealers have had poorer sales records in the past week than in any of the four or five weeks preceding. Although a great deal of business is pending, fresh uncertainty seems to have come into the minds of prospective buyers. A good many manufacturers are undoubtedly disappointed that seasonal improvement in their business has not been all that had been hoped for. In addition to their own sales, they are keeping a close tab on other trade indexes. A slight recession in steel production may have had some effect on business sentiment. Moreover, the influence of a reactionary stock market is not to be discounted, at least so far as the immediate New York district is concerned.

CHICAGO

The local machine tool market is, if anything, more uncertain than at beginning of the month. Sales are less than a week ago and new inquiries are decidedly off. Reports are persistent that a group of men formerly in the radio and electric refrigeration business have acquired a Chicago location, where new lines of these commodities are to be manufactured.

The Union Pacific Railroad has issued a machine tool list as follows: A portable cylinder boring machine, a carwheel borer, an axle burnishing lathe, a bar folder, a slitting shear, a burring machine, a forging press, a 5000-lb. steam hammer, a rod cutter, a veneer press, a 2-in. portable pipe threader, a 20-in. drill press, a superheater grinder, two bench grinders, a drill pointer, a 16-in. engine lathe, a 24-in. x 4-in. dry grinder and two buffing machines.

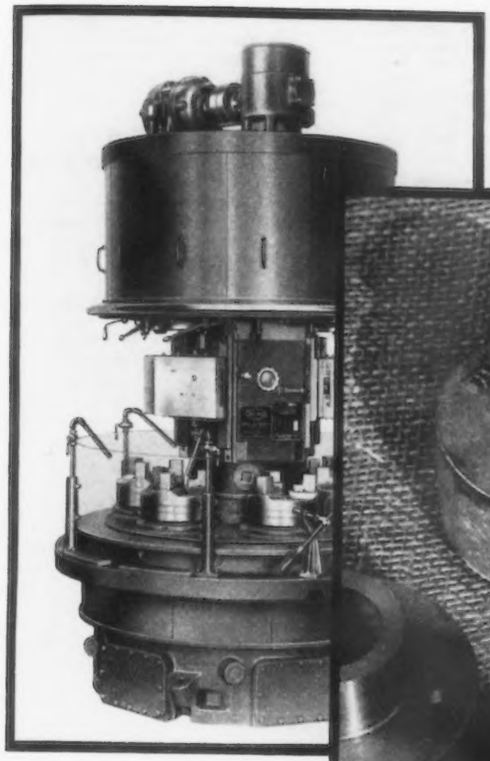
PITTSBURGH

Machine tool sales have shown no change the past week, but new inquiry has been slightly better. It is reported that the Westinghouse Electric & Mfg. Co., East Pittsburgh, will issue a list of several items in the next two or three weeks. Meanwhile, some tools ordered recently by electrical equipment manufacturers are being held up pending final placing of electric locomotive business by the Pennsylvania Railroad.

The Board of Education of Mount Lebanon, Pa., has taken bids on five metal-working machines and miscellaneous wood-working machinery, orders for which will be placed before May 1. Otherwise new buying is confined principally to single tools and in most cases urgent delivery is a factor.

CLEVELAND

The Amtorg Trading Corpn. has started to purchase a large amount of equipment for Russia for the Autostroy automobile plant and in the past week placed orders for a few tools with a Cleveland manufacturer. Machinery for this plant, all of which is expected to be bought shortly, will include 60 automatic machines, a round lot of milling machines, grinding machines amounting to about $160,000, and considerable miscellaneous machine tool equipment. Inquiry for another large lot of equipment for a ball



BULLARD
production units
may be purchased on
deferred payment plan

The Bullard Company

Bridgeport
Connecticut

Mult-Au-Matics provide a universally adaptable method of machining chucked work by simultaneously performing a variety of multiple operations at the individual rates of speed and feed most suitable to the economical performance of each operation, yet harmoniously balanced for the most efficient production of the completed job.

and roller bearing plant in Russia will come out as soon as the Autostroy business is placed.

Locally, the machinery market improved slightly the past week in that there were more single tool orders than for several weeks. Inquiry continues rather light.

MILWAUKEE

Machine tool business so far in April continues to improve, although volume is not large. One local leading tool company had a 100 per cent increase in sales during March, as compared with February, and reports last month the best since August, 1930. Business was not restricted to a few localities, but came from at least 20 of the principal manufacturing centers of the United States and from Great Britain. While single tool sales were in the majority, several customers took from two to three units. Inquiry so far this month has been better than at any time this year.

CINCINNATI

Current orders are small. While in many instances factories have operated for some months on curtailed schedules, one or two plants have been forced to reduce operations still further. Inquiry dragged somewhat the past week. Some manufacturers report that prospective purchasers have withdrawn from the market because of lack of funds, and the entire buyer attitude appears to be one of retrenchment.

NEW ENGLAND

Dealers report some improvement in business the past week, but no sales of large volume. Details are still withheld because of keen competition, but it is intimated that at least one line of lathes is selling better than at any time this year, and that some large equipment has been moved. New inquiries are few and a large majority of old prospects give no indication of closing.

WASHINGTON

Bids for machine tools and other equipment will be opened as follows by the Bureau of Supplies and Accounts, Navy Department, quotations to be f.o.b. at points indicated:

April 21.—Combination woodworking machine, Naval Training Station, Great Lakes, Ill.; heat treating electric furnace, Navy Yard, Brooklyn; motor - driven riveting machine, Navy Yard, Brooklyn; air-driven forging hammer, Hampton Roads, Va.; automatic railroad cut off saw, Navy Yard, Brooklyn; motor-driven surface planer, Navy Yard, Brooklyn; 20-in., motor-driven, metal-working shaper, Navy Yard, Puget Sound (Bremerton), Wash.; 36-in. motor-driven band saw, naval torpedo station, Newport, R. I.; universal machine for tensile, compression and bending tests, Munhall, Pa.

April 28.—One ⅝-in. motor-driven column type sensitive and one ⅜-in. motor-driven bench type drilling machine, naval air station, Seattle, Wash.; combination woodworking machine, St. Louis Municipal Airport, Robertson, Mo.; electrically operated ball-bearing cut off saw, Navy Yard, Mare Island, Cal.; motor-driven drilling and milling boring machine, Navy Yard, Mare Island, Cal.; motor-driven polishing machine, Navy Yard, Norfolk (Portsmouth), Va.; motor-driven high power, heavy-duty plain horizontal milling machine, f.a.s. vessel, Pier 32, San Francisco.

May 5.—21-in. motor-driven sliding head drill press, Naval Operating Base, Hampton Roads, Va., or f.a.s. vessel, Pier 44, San Francisco.

▲▲▲

New York

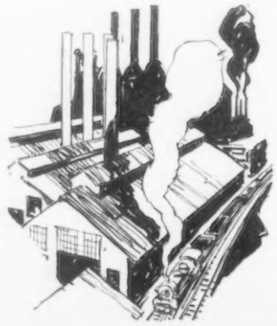
PLANS are under way by Board of Education, New York, for 10-story graphic arts vocational school, including all branches of printing and allied trades, on site of present Public School No. 28, soon to be razed, to cost more than $1,000,000 with machinery. William C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is school architect. Vocational Survey Commission of school board is in charge.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, has purchased former erecting shop of E. W. Bliss Co., Brooklyn, totaling about 100,000 sq. ft. floor space, for Eastern branch factory, storage and distributing plant.

Superintendent of Lighthouses, Third District, Staten Island, N. Y., is asking bids until April 23 for 41 steel bodies for light buoys, each with skeleton lantern tower and bottom counterweight, from 9 ft. diameter and 35 ft. long, to 7 ft. diameter and 18 ft. long.

American Airplane & Engine Corpn., New York, has been organized to consolidate Fairchild Airplane Mfg. Corpn., 122 East Forty-second Street, and Fairchild Engine Corpn., same address, manufacturers of airplanes and aircraft engines, respectively. Incorporators include Thurman H. Bane and V. E. Clark. New company will operate plants at Hagerstown, Md., and Montreal, Que.

Department of Hospitals, Municipal Building, New York, has plans for a one-story automobile service, repair and garage building at Sea View hospital, Dongan Hills, Staten Island, to cost close to $100,000 with equipment. Extensions and improvements will be made in power plant at same institution, to cost about $50,000. Sibley & Fetherston, 205 East Forty-second Street, are architects for both projects.



Rivy Mfg. Corpn., New York, care of Max Brilliant, 1414 Forty-seventh Street, Brooklyn, recently organized by Mr. Brilliant and associates, plans operation of factory for manufacture of lighting fixtures and equipment. Isaac L. Propp, 223 Second Avenue, New York, is interested in new company.

Peter Doelger Brewing Co., Fifty-fifth Street and First Avenue, New York, is liquidating business and will dispose of all machinery and equipment, including complete bottling plant equipment, machine shop, tin smithing plant, forge shop, etc.

Officials of Nichols Copper Co., 40 Wall Street, New York, have organized Nichols Engineering & Research Corpn., to operate Herreshoff furnace division of parent organization, including manufacture and installation of furnace units, parts, etc. New company will also be identified with Sulphide Research Corpn., Ltd., Montreal, and will develop and manufacture its Flash roasting equipment and processes for ore service in United States. Other metallurgical and chemical equipment will also be produced. C. W. Nichols, head of parent company, will be chairman of board.

Board of Water Supply, 346 Broadway, New York, will receive bids until April 28 for bronze gate valves, bronze needle valves, bronze piping, bronze doors, bronze and steel castings, and kindred engineering equipment for drainage shaft 9A, city tunnel No. 2. Benjamin F. Einbigler is secretary.

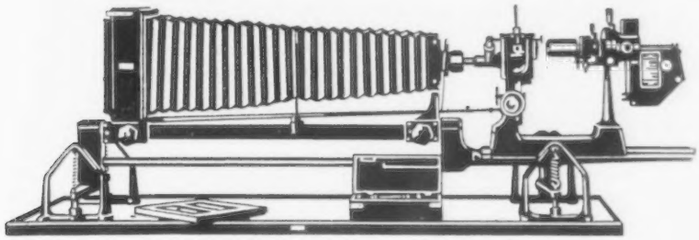
International Cork Co., Brooklyn, care of Irving Adelsohn, 44 Court Street, Brooklyn, architect, has plans for a two-story factory, 100 x 200 ft., to cost over $75,000 with machinery.

Metal Windows, Inc., 314 Ogden Street, Newark, representative for Campbell Metal Window Corpn., Bush and Hamburg Streets, Baltimore, has leased one-story building at 306-8 Adams Street for new factory branch, storage and distributing plant.

Continental Paper Co., Bogota, N. J., has awarded general contract to Claus Ahrens & Co., 72 Upland Street, East Rutherford, N. J., for two one-story mill additions, to cost over $45,000 with equipment. Johnson & Wierk, Grand Central Terminal, New York, are architects. F. D. Campbell is chief engineer at mill.

Public Service Electric & Gas Co., Terminal Building, Newark, has authorized expansion and improvements at steam-operated electric generating plants at Kearny and Burlington, N. J., to cost about $9,500,000. Work at first noted station will include installation of new 75,000-kw. steam turbo-generating unit and other machinery. Program at Burlington station provides for installation of an 18,000-kw. steam turbo-generator, high pressure boilers and auxiliary equipment. Company engineering department will be in charge. Permission has been secured for sale of bond issue totaling $22,300,000.

J. & H. Machine Works, Inc., Little Ferry, N. J., care of Dippel, Davis & Stewart, 140 Forty-eighth Street, Union City, N. J., attorneys, has been organized by Cornelius Jordan, Weehawken, N. J., and Edward Hubelmeyer, Little Ferry,



Laboratory Control Eliminates Costly Mistakes « »

PRECISION Optical Instruments in the hands of trained laboratory men are the key to uniform production and quality that does not vary from your required standards. In the metal industries the B & L Metallographic Equipment is the apparatus to reveal the facts to your metallurgists about your raw materials or your finished product.

Magnifications as high as 6000X can be photographed sharply and clearly. The design of the equipment eliminates all vibration of the specimen or optical parts. There is no shift of focus, regardless of the weight of the specimen or length of exposure. Permanent alignment of the microscope and illuminating unit saves time and insures high quality photographs.

Send for Catalog E-210 for complete details.

BAUSCH & LOMB OPTICAL COMPANY
621 St. Paul Street « » Rochester, N. Y.

TO GREATER VISION THROUGH OPTICAL SCIENCE
BAUSCH & LOMB

BAUSCH & LOMB

MAKERS OF ORTHOGON EYEGLASS LENSES FOR BETTER VISION

with capital of $125,000, to establish a general machine works at Little Ferry, including production of machinery and parts.

George Swan & Co., 500 Kingsland Road, Nutley, N. J., manufacturers of water heaters and parts, copper tubing, etc., are planning one-story addition, 80 x 300 ft., to cost over $40,000 with equipment. George Swan is head.

Best Die Casting & Stamping Co., Inc., New York, has removed to larger quarters at 54-56 Bleecker Street.

Richter Transmission Co., 901 Third Avenue, Brooklyn, distributor of transmission equipment, will add to its stock a complete line of mill supplies and rubber goods.

▲▲▲

South Atlantic

WORK is under way by Maryland Paperboard Co., 7 St. Paul Street, Baltimore, on remodeling former mill of Marley Paper Mfg. Co., Childs, Md., recently acquired, for production of corrugated paperboard products.

Potomac Edison Co., Hagerstown, Md., has arranged for a bond issue of $5,000,000, part of proceeds to be used for extensions and improvements in power plants and system. Company is affiliated with West Penn Electric Co., Pittsburgh.

Board of District Commissioners, District Building, Washington, is asking bids until April 29 for parts for cast iron lamp posts.

United States Coast Guard Headquarters, Department of Construction and Repair, Washington, is considering early call for bids for one-story boat-building and repair shop at Coast Guard station at Curtis Bay, Baltimore.

National Biscuit Co., 449 West Fourteenth Street, New York, contemplates call for bids in about 60 days for addition to plant at Atlanta, Ga., three stories and basement, 80 x 250 ft., with ovens, power equipment, conveying and other machinery, to cost more than $400,000. L. Wirsching, Jr., company headquarters, is company engineer.

Department of Buildings and Grounds, New Navy Building, Washington, Col. U. S. Grant, 3d., in charge, contemplates call for bids in June for eight-story Federal storage and distributing plant and supply warehouse, 214 x 498 ft., to cost about $1,700,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is consulting engineer.

Service Radiator & Fender Co., Inc., Baltimore, has been organized to take over and expand company of same name, with metal-working plant at Twenty-fifth and Aisquith Streets. New company is headed by James C. Beatty and Reynold H. Gunther.

Chesapeake & Ohio Railway Co., Richmond, Va., will carry out expansion at classification yards at Russell, Ky., including shop and mechanical facilities, to cost $575,000. C. W. Johns, Richmond, is chief engineer in charge.

D. E. Frye, Hickory, N. C., has awarded general contract to W. A. Setzer, Catawba, N. C., for furniture manufacturing plant at Highland, consisting of two one-story units, each 50 x 85 ft., to cost close to $35,000 with equipment. Q. E. Herman, Hickory, is architect.

Appalachian Electric Power Co., Roanoke, Va., has secured permission to erect

a hydroelectric generating plant on New River, near Radford, Va., where power dam will be located. Entire project will cost over $6,000,000 with transmission system.

General purchasing officer, Panama Canal, Washington, is asking bids until April 24 for cast vanadium-steel yokes; forged steel axles, hangers and pawls; warehouse trucks, cast steel trolley wheels, wire rope, joint screw spikes, etc.; until April 29 for wire and cable, wire rope, spring balance scales, turnbuckles, milk cans, cable clips and other equipment.

Constructing Quartermaster, Fort Monroe, Va., will receive bids until April 30 for two air corps warehouse units at Langley Field, Va.

Edward Katzinger Co., Baltimore, has let contracts to Lockwood Greene Engineers, Inc., for two-story addition, 80 x 143 ft. for manufacture of bakers' tinware and kitchen utensils. Plant expansion is necessitated by recent purchase of A. & J. Mfg. Co., Binghamton, N. Y., manufacturer of kitchen utensils.

▲▲▲

Philadelphia

ARRANGEMENTS have been made by Merco-Nordstrom Valve Co., Philadelphia, for local manufacturing and distributing center for Eastern division in building at Botanic Avenue and Forty-ninth Street, totaling 24,000 sq. ft. floor space. Company has moved plant from Belleville, N. J., to new location, where expansion will be carried out. Main plant and headquarters are at San Francisco and Oakland, Cal.

Sun Oil Co., 1608 Walnut Street, Philadelphia, will soon begin work on continuation of pipe line in Mahoning and Portage Counties, Ohio, to cost over $700,000 with pumping and other facilities. Entire line will run from Marcus Hook, near Philadelphia, to Cleveland, and will cost about $5,000,000.

Henry Edelman, 612 West Olney Avenue, Philadelphia, and associates have organized Edelco Mfg. Co., and plan operation of local factory for production of plumbing equipment and supplies. Samuel Silvers, 5136 Nebus Street, is interested in new company.

Pennsylvania Power & Light Co., Allentown, Pa., has arranged for a bond issue of $100,000,000, part of fund to be used for expansion and improvements. Company has recently acquired about 143 acres near Hummelstown, Pa., and is considering power substation on portion of site. It is affiliated with Electric Bond & Share Co., 2 Rector Street, New York.

Committee on Supplies and Printing, Board of Education, 9 South Stockton Street, Trenton, N. J., is asking bids until May 5 for quantity of manual arts heavy equipment, manual arts sundry equipment, science furniture, science sundry equipment, steel shelving, steel lockers, etc. Charles B. Warren is superintendent of supplies.

City Council, Reading, Pa., has secured permission to arrange a bond issue of $200,000, part of fund to be used for erection and equipment of a municipal machine shop.

Campbell Soup Co., Second and Market Streets, Camden, N. J., has awarded general contract to Anglin-Norcross, Ltd., Temple Building, Toronto, for new canning plant at New Toronto, to cost over $300,000 with machinery.

J. H. Armitage, Colonial Hotel, Reading, Pa., and C. H. Contos, 1247 Perkiomen Avenue, Reading, have organized J. H. Armitage Co., to operate local works for manufacture of tools, machine parts, etc. L. M. Miller, 111 Mulberry Street, is also interested in new company.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is planning removal of engine houses with shop facilities from Harrisburg, Pa., to Lucknow, where capacity will be increased to cost over $100,000 with equipment.

Charles Warner Co., Wilmington, Del., building materials, has begun erection of new concrete central mixing plant near its sand and gravel deposits at Morrisville, Pa., to cost over $50,000 with equipment.

▲▲▲

New England

CONTRACT has been let by Keeney Mfg. Co., Newington, Conn., manufacturer of plumbing equipment and supplies, to R. G. Bent Co., Inc., 93 Edwards Street, Hartford, Conn., for one-story and basement addition, 40 x 120 ft., to cost about $40,000 with equipment.

Rhode Island Public Service Co., Providence, a unit of New England Power Association, Boston, has authorized increase in class B stock from $9,600,000 to $18,000,000, part of fund to be used for expansion and improvements in plants and system.

Frank and C. R. Wallin, Bridgeport, Conn., have organized Wallin Machine Co., with capital of $50,000, and plan operation of local machine works for manufacture of tools and mechanical equipment.

Town Council, Hamden, Conn., has secured permission to issue bonds for $500,000 for purchase of site and construction of new high school, to include a manual training department.

Kupfer Brothers Co., Northbridge, Mass., manufacturer of coated paper stocks, contemplates a one-story mill addition, to cost close to $65,000 with equipment.

Ideal Metal Products, Inc., West Boylston, Mass., care of Israel S. Lesber, 21 Havelock Road, Worcester, Mass., treasurer, recently organized by Mr. Lesber and associates, plans operation of local factory for manufacture of metal goods.

Eastern Auto Parts Co., 182 Eastern Avenue, Malden, Mass., has awarded general contract to Glazier Co., Everett, Mass., for one-story addition, 75 x 90 ft., including improvements in present unit, to cost about $35,000.

Torrington Co., Torrington, Conn., man-

THE WORKS MANAGER OF A WELL-KNOWN MACHINERY MANUFACTURING PLANT *Says*——

READING The Iron Age each week protects you against losses you might incur by reason of failure to be informed of important developments in the industry.

The development might be an improved process, a new machine that will cut your production costs sharply, a new metal or alloy, a price change, a new idea in plant management.

Providing this information requires the services of two separate staffs:

1. *An editorial staff, with field editors in the major industrial centers*
2. *An advertising staff, with representatives in the major industrial centers*

Both work for you, and both with the same aim—to furnish you with information that will help you increase your profits by reducing your costs, improving your product and your methods.

The editors comb the industry for new ideas you can use to advantage. The advertising staff sees to it that those who have equipment and materials to offer keep you informed of the advantages that will accrue to you by using their products.

The advertising pages are full of information of value to you. You will find there, for example:

An Air Valve that will Reduce Your Compressed Air Costs

A 1/16-inch hole in an air line wastes 278,700 cu. ft. of air per month—$336.00 worth of air per year. In the advertising section is described an air valve that is leakless, requires no packing, no tapered plugs, and permits throttling.

"The advertising contained in The Iron Age is an education within itself."

Heat-Treating Costs Reduced $15,000.00 a Year

A certain manufacturer is saving this large sum in direct labor alone, at the same time improving the quality of his heat-treated parts. See the advertising pages for further information.

Iron Castings with an Average Tensile Strength of 87,000 lb. per sq. in.

Wear-resistant alloy iron castings, having a Brinell hardness of 220 to 250 as cast (hardenable up to 500), with an elongation of 6 to 10 per cent in two inches, are featured in an advertisement in this issue..

Planer Tools That Cut a Mile on One Grind

A gang of six high-speed steel planer tools, 1/4-in. wide, cuts one mile of grooves between grinds in tough forged steel. Feed is .015-in. per stroke at 25 ft. per min.

Saves Weight in High-Pressure Vessel by Lining with Corrosion-Proof Metal

Need for extra heavy initial wall thickness in high-pressure vessels is eliminated by corrosion-proof lining.

Magnetic Clutch Applied to Power Press

Large power press, equipped with multiple disc magnetic clutch meets exacting safety requirements.

These are just a few specimens. The advertising, as well as editorial, pages are literally alive with ideas that will fight valiantly for you in the battle for lower costs.

ufacturer of steel needles, bicycle spokes, small metal products, etc., has arranged for purchase of Lydall & Foulds Co., Manchester, Conn., manufacturer of needles, etc., and will consolidate. It is proposed to remove Manchester plant to main works at Torrington.

Contract will be let in June for an addition to assembling shop at Government torpedo station, Newport, R. I., for which appropriation of $125,000 is available. Bureau of Yards and Docks, Washington, is in charge.

American Gill Screen Co., 1 Eudora Street, Providence, R. I., is about to start erection of one-story machine shop addition.

▲▲▲

Chicago

CONTRACT has been let by Harper-Wyman Mfg. Co., 1634 East Seventieth Street, Chicago, manufacturer of gas range equipment, brass goods, etc., to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story addition, 60 x 60 ft., to cost close to $25,000 with equipment.

Pressed Steel Car Co., Brandon Avenue and 126th Street, Chicago, plans rebuilding part of mill destroyed by fire April 8, with loss close to $50,000 including equipment.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has plans for a seven-story distributing plant, 108 x 225 ft., to cost over $750,000 with equipment. Part of unit will be used for repair shops and for equipment storage and distribution. H. V. Von Holst, 79 West Monroe Street, is architect.

Banner Bed Corpn., Chicago, recently organized to manufacture metal bedsteads, has leased about 9650 sq. ft. floor space at 400-8 North Oakley Boulevard, for establishment of plant.

Crystal Ice Co., Sioux City, Iowa, has awarded general contract to H. A. Main & Co., Marsh-Place Building, Waterloo, Iowa, for one-story artificial ice-manufacturing plant at Waterloo, 80 x 120 ft., to cost about $75,000 with machinery.

City Council, Grand Junction, Colo., is considering bond issue of $750,000 for a municipal electric light and power plant. Wood & Weber, 110 Fourteenth Street, Denver, are consulting engineers.

Marshall Canning Co., South Third Avenue, Marshalltown, Iowa, has begun erection of new two-story canning plant, 60 x 120 ft., at Roland, Iowa, to cost about $40,000 including conveying, canning and other machinery.

Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, has arranged for a bond issue of $40,000,000, part of proceeds to be used for extensions and improvements in plants and system.

Chicago Governor & Mfg. Co., 511 South Latlin Street, Chicago, recently organized with capital of $40,000, plans operation of factory for manufacture of tools and other equipment. Eugene V. Diggins and Maurice J. Costello are heads.

City Council, Vermilion, S. D., is considering installation of a municipal electric light and power plant, using Diesel engine generating equipment, to cost about $55,000.

Reorganization of Chandler Pump Co., Cedar Rapids, Iowa, following disposal of holdings of W. H. Dunshee, former president, who retired March 31, has been effected with election of C. R. Chandler, grandson of founder of company, as president; A. E. Durin, vice-president; Walter E. Dunshee, secretary, and George A. Johnson, treasurer.

Inland Steel Co., Chicago, has ordered following overhead electric traveling cranes: Three 60-ton, 100-ft., span from Alliance Machine Co.; 60-ton, 100-ft. and 50-ton, 55-ft. span from Whiting Corpn.; 25-ton, 80-ft. span from Shaw Electric Crane Works; three 15-ton, 100-ft. span and eight 15-ton, single hook, 100-ft. span from Harnischfeger Corpn.

▲▲▲

Milwaukee

A NEW line of stationary conveyors, in addition to portable line, has been placed in production by Northern Conveyor & Mfg. Co., Janesville, Wis., which recently completed plant extension.

Dr. M. A. Froney, Racine, Wis., has organized Froney Electrocut, Inc., to manufacture electrically operated vegetable cutting tools for hotels, restaurants, etc. E. L. Christensen and Paul F. Jorgensen are associated in the enterprise.

Leader Card Works, 916 South Sixth Street, Milwaukee, manufacturer of die cut and rotary cut cards for printers and publishers, has placed contracts for an addition, 25 x 80 ft., three stories and basement, costing about $35,000.

LaCrosse Refrigerator Co., LaCrosse, Wis., manufacturer of steel ice boxes, electrical refrigerator cabinets, etc., has leased plant of Cold Storage Refrigerator Co., Eau Claire, Wis., and recalled 100 of its former employees to handle overflow of orders from main plant. No retooling is necessary at present.

G. M. Rix, Cedarburg, Wis., has organized Hi-Way Alarm Co. to manufacture new type of electrically operated bank protection system he has perfected. It has automatic signal control and is designed for banks in small cities without adequate burglar protection. Production will be started immediately.

To conserve assets and maintain it as a going concern, stockholders of Fuller & Johnson Mfg. Co., Madison, Wis., have voted to make an assignment, and C. L. McMullen, president, with William B. Roys, president, General Casualty Co., Madison, have been appointed assignees. Company originally manufactured farm machinery, but three years ago entered into manufacture of gasoline engines exclusively. Claims of unsecured creditors amount to about $190,000. Secured indebtedness consists of a bond issue of which $290,000 is outstanding.

William Luitink & Sons Mfg. Co., 775 Eighteenth Street, Milwaukee, manufacturer of tools, dies, stampings and special machinery, has changed its name to Luitink Mfg. Co.

Buffalo

PERMISSION has been granted New York State Electric & Gas Corpn., Ithaca, N. Y., to erect an electric power plant at Randolph, N. Y.; also for erection of gas plants at Pendleton, Niagara County, and Shagticoke, Rensselaer County. Company engineering department will be in charge.

City Council, Buffalo, has authorized bond issue of $123,182, majority of fund to be used for erection of a municipal marine airport, with hangars, repair facilities, etc., for seaplanes. Department of Public Works will be in charge.

Syracuse Lighting Co., Syracuse, N. Y., an interest of Niagara-Hudson Power Corpn., Electric Building, Buffalo, has awarded general contract to Stacey Brothers Gas Construction Co., Cincinnati, for a new gas holder and distributing plant of 6,000,000-cu. ft. capacity.

Charles E. Kohlmetz Iron Works, Inc., Rochester, N. Y., has been formed with capital of $20,000 to take over and expand company of same name with local plant at 180 North Water Street. Charles H. Kohlmetz and Herbert R. Morton head new organization.

Semet-Solvay Engineering Corpn., Solvay, Syracuse, N. Y., affiliated with Semet-Solvay Co., same address, has secured patents and manufacturing rights to Koller gas producer and Koller mechanical grates, with other industrial gas equipment heretofore manufactured by Gas Research Co. and Smith Gas Engineering Co., Dayton, Ohio, and will develop facilities for new lines in connection with present Semet-Solvay gas and coke plant machinery, welded equipment, etc.

Morrison Machine Products, Inc., Elmira, N. Y., has awarded contract for a one-story machine shop addition, 80 x 135 ft., to cost $25,000 without equipment.

▲▲▲

Pittsburgh

CONTRACT has been let by Mayer Body Corpn., 6459 Frankstown Avenue, Pittsburgh, manufacturer of automobile bodies, to Edward Crump, Jr., 1031 Bigelow Boulevard, for one and two-story addition, 30 x 100 ft. and 50 x 100 ft., to cost about $50,000 with equipment. Lake & Davidson, Negley Building are architects. W. G. Mayer is president.

Gulf Refining Co., Frick Annex, Pittsburgh, has applied for permission to erect river terminal for oil storage and distribution at Westover, W. Va., on Monongahela River, including pipe lines, etc.

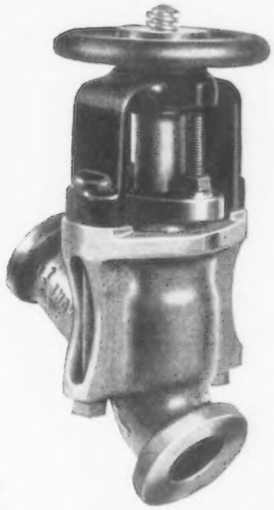
H. Kenelm Binns, 5410 Plainfield Street, Pittsburgh, and associates have formed Binns Mfg. Co., and plan operation of local plant for manufacture of iron, steel and other metal products. Winfield H. Binns, Mount Lebanon, Pa., will be one of heads of new company.

Elk Tanning Co., Ridgway, Pa., plans installation of conveying and other mechanical-handling equipment in two

ON ACID LINES

these valves give longer service . . . . . at less cost

The Y Valve shown above is Durimet alloy steel. Durimet is a nickel-chrome-silicon steel especially applicable in weak sulphuric acid conditions. This valve has a seat both reversible and renewable, full floating disc and leak-proof packing. By reversing the lower body casting it may be quickly changed into an angle valve.



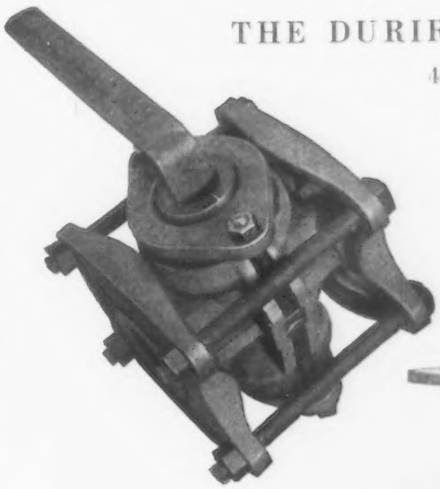
The Duriron Y Valve is preferred for a great many acid conditions due to the following features: Full opening and nearly straight flow, no sticking, no scoring of seats, may be repacked under pressure when in closed position, narrow seat, ease of relapping and regrinding when necessary.

Highly resistant to corrosion, valves of Duriron manufacture installed on acid lines have such a long life that the cost of frequent replacements is eliminated. In fact, under most conditions they serve as practically permanent equipment.

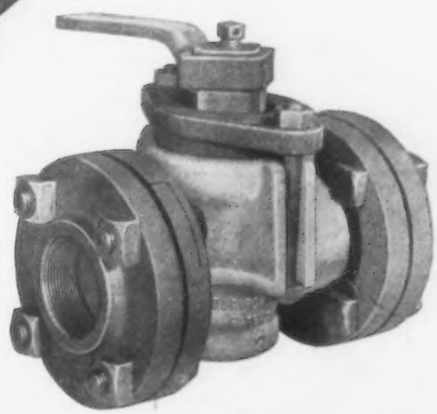
Valves designed and made by the Duriron Company are of Duriron, or Durimet or Durco Nirosta (KA2S) alloy steels. The many types and sizes of valves offered provide a range to meet almost any situation in handling corrosive solutions.

On lines carrying pickling and plating solutions, these valves have a proven record. They work when they are needed, throughout their long-lasting, expense-reducing service. Our engineers will gladly advise with you as to how these valves may benefit your production.

THE DURIRON COMPANY, INC.
438 N. Findlay St.
Dayton, Ohio



The Duriron Plunger Release Plug Valve overcomes the difficulty of sticking in this type of valve. If ever necessary, a smart tap with the wrench on the bottom of the plunger releases the plug instantly. This valve is easily operated and does not score. Can be used with either lead or flanged pipe, and with threaded pipe by the addition of companion flanges.



The Duriron-Nordstrom Lubricated Plug Valve combines acid-resisting properties of Duriron with internal lubricating features. The lubricant reaches the base of the plug through ducts. As the plug is turned, a film of lubricant completely seals the valve against leaks.

See Our Exhibit
Chemical Show, May 4-9
Booth 20

DURIRON

one-story additions, 50 x 160 ft. and 74 x 100 ft., entire project to cost over $90,000.

Columbia Gas & Electric Corpn., 61 Broadway, New York, will build a pipe line for natural gas from New River, W. Va., to Tug Fork of Big Sandy River, Kentucky State line, 75 miles, as a section of system from Kentucky to Coatesville, Pa., entire project to cost over $8,000,000 with compressor stations and other facilities. Columbia Gas Construction Co., a subsidiary, will build a similar pipe line in Virginia.

Mundorf Heating Systems Co., Sharon, Pa., recently organized with capital of $100,000 by E. E. Clepper, McDowell Bank Building, and associates, will operate local plant for manufacture of heating systems and equipment. James J. Mundorf, Sharon, is president.

▲▲▲

St. Louis

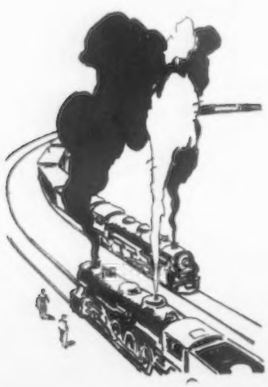
CITY Council, Moberly, Mo., is considering bond issue of $600,000, for municipal electric light and power plant, including power distributing system. Russell & Axon, 6200 Easton Avenue, St. Louis, are consulting engineers.

Southland Cottonseed Products Co., First and Troost Streets, Kansas City, Mo., plans rebuilding part of plant recently destroyed by fire, with loss close to $50,000 with equipment.

Silica Products Co., Harrison, Ark., D. D. Dunkin, president, will build a new silica sand plant at Everton, about 15 miles from Harrison, where sand properties will be developed. Initial plant will have a capacity of 3000 tons a day, and will cost over $70,000 with loading, conveying and other equipment. Company operates a silica sand plant at Guion, Ark.

In connection with new ice-manufacturing and car-icing plant to be built by American Refrigerator Transit Co., Thirteenth Street, St. Louis, at Leeds, Mo., Mountain Ice Co., 6611 Euclid Avenue, Cleveland, affiliated with City Ice & Fuel Co., same address, will take over property under lease and will operate plant for railroad service. Project will cost over $300,000 with machinery. General contract has been let to R. S. Blome Co., First National Bank Building, Chicago.

Board of Education, Pawnee City, Neb., contemplates installation of manual training equipment in new senior and junior high school to cost $110,000, for which bond issue is being arranged. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.



Od-Peacock-Sultan Co., 112 North Second Street, St. Louis, manufacturer of industrial chemicals, etc., has approved plans for a four-story plant to cost close to $100,000 with equipment. Clymonts & Heinicke, Wainwright Building, are architects. Company was recently organized to take over Od Chemical Co., New York; Peacock Chemical Co., and Sultan Co., both of St. Louis. New York plant of Od Chemical Co. will be removed to new location, where production will be concentrated.

Kansas City Southern Railway Co., Kansas City, Mo., is considering an addition to local grain elevator, with conveying, screening and other equipment, to cost over $200,000. Company engineering department is in charge. Elevator is operated under lease by Moore-Seaver Grain Co., Board of Trade Building.

Marquette Cement Mfg. Co., Cape Girardeau, Mo., is planning improvements and additions, including installation of grinding and conveying machinery, boilers and generators.

▲▲▲

Cincinnati

PLANS have been authorized by Board of Education, Springfield, Ohio, for new junior high school to cost about $300,000, to include manual training and science departments. Eastman, Budke & Marley W. Lethley, Springfield, are architects.

Dayton Tool & Engineering Co., Dayton, Ohio, care of Ruey F. Hodapp, Dayton, recently organized by Mr. Hodapp and associates, plans operation of local factory for manufacture of tools and mechanical equipment. Dale Hodapp, Dayton, is one of incorporators.

John Deere Plow Co., Moline, Ill., contemplates one-story branch assembling plant at Nashville, Tenn., to cost $75,000 with equipment. Portion of unit will be used for storage and distribution.

Louisville Water Co., Louisville, is planning expansion and improvements in waterworks, including installation of pumping machinery and other power equipment, to cost $1,500,000. John Chambers is chief engineer.

Waco Aircraft Co., Dayton, Ohio, is carrying out improvements at plant, to include installation of tools, jigs, etc., for production of a new cabin airplane recently developed, including parts production and assembling.

Board of Education, Delaware, Ohio, plans installation of manual training equipment in new two and three-story high school, to cost about $325,000, for which bids are being asked on general contract. Thomas D. McLaughlin, Lima, Ohio, is architect.

City Council, Fayetteville, Tenn., contemplates erection of municipal airport near Skinnum, fronting on Huntsville Highway, to include hangar with repair facilities and other field units.

City Council, Piqua, Ohio, is considering erection of a municipal electric light and power plant. A fund has been approved to make survey and estimates of cost.

Womwell Automotive Parts Co., 151 East Short Street, Lexington, Ky., manufacturer of automobile parts and equipment, has arranged for increase in capital from $60,000 to $200,000 for expansion.

Gulf States

PLANS are under way by Gulf Pipe Line Co., Frick Annex, Pittsburgh, affiliated with Gulf Refining Co., same address, for pipe line from Lathrop oilfield, Gregg County, Tex., with branch lines from Joiner and Kilgore oilfields, Rusk County, Tex., connecting with main Gulf trunk line to Port Arthur, Tex., where refinery is operated, to cost over $800,000 with pumping stations and other equipment.

City Council, Canton, Miss., is considering rebuilding municipal electric light and power plant, and waterworks, recently destroyed by fire, with loss close to $50,000 including equipment.

Cummer-Graham Co., Paris, Tex., recently organized with capital of $1,000,000, will consolidate Cummer Mfg. Co., Paris, and Graham Mfg. Co., Longview, Tex., manufacturer of wooden cases, wirebound containers and other kindred products. New company plans expansion and will operate plants at Paris, Longview, Beaumont, Mineola and other points.

Cameron County Water Improvement District No. 14, care of Col. L. P. Stover, Brownsville, Tex., president, is asking bids until April 21 for installation of irrigation works on 15,000-acre tract near San Benito, Tex., to cost about $800,000 with equipment. W. E. Anderson, San Benito, is engineer. Cameron County Water Improvement District No. 13, care of P. W. Samuels, Brownsville, president, will receive bids until April 25 for installation of irrigation works in Arroyo Garden district, covering about 6000 acres, to cost $500,000 with equipment. H. B. Livingston, San Benito, is engineer.

City Council, Birmingham, has plans for expansion and improvements at municipal airport, including new hangars, rapair shops and other field units, for which a bond issue of $1,250,000 was recently authorized. Robert Acker is director of municipal airport.

Guiberson Corpn., Dallas, Tex., manufacturer of oil well equipment and supplies, is perfecting a new Diesel aircraft motor, using crude oil as fuel, and plans early establishment of new plant for parts production and assembling. New works will be operated as an affiliated interest. S. A. Guiberson, Jr., is president.

City Council, Brownsville, Tex., is arranging a bond issue of $150,000 for extensions and betterments in municipal electric light and power plant and waterworks, including additional equipment.

City Council, Laurel, Miss., has plans for a new hangar at municipal airport, 80 x 100 ft., with repair and reconditioning facilities, to accommodate eight airplanes at one time. Paul C. Klyce is city engineer.

Hydro Plant Corpn., San Antonio, Tex., care of L. E. Rush, 1017 West Laurel Street, architect, recently organized, has plans for one-story plant for manufacture of hydraulic machinery, hydraulic brakes and other equipment, to cost over $100,000. D. J. Little is president.

Shippers Co-Operative Ice Co., Crystal City, Tex., recently organized, is planning new ice-manufacturing and refrigerating plant with capacity of 150 tons a day, to cost close to $200,000 with machinery. A cold storage plant will be built on adjoining site with capacity of 5000 tons. J. L. Price is president.

Standard Peat Products Corpn., Room

Inherent quality . . . but so very obvious!

NO ONE can afford to be casual any longer about the purchase of cap screws. Precision standards in our customers' plants required greater precision on our part—and we produced cap screws by the Kaufman Method, *patented.* We made, by this unique method of extrusion, a *stronger* screw. We made a much more *accurate* screw. And of course our own pride in our product suggested a better *finished* screw than had been commercially practical. As a matter of fact, Cleveland Cap Screws are as good as they look.

THE CLEVELAND CAP SCREW COMPANY
2930 E. 79th St., Cleveland, Ohio

Address the Nearest Company Warehouse—Complete stocks at

CHICAGO, 726 W. Washington Blvd.
DETROIT . . 520 W. Congress Street
PHILADELPHIA . 12th & Olive Sts.
SAN FRANCISCO . 548 Howard St.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . . . 224 E. 11 Street

CLEVELAND CAP SCREWS

1239, 521 Fifth Avenue, New York, is considering erection of new peat manufacturing plant on site now being selected in Florida, to cost over $75,000 with equipment. Installation will include one or more gasoline locomotives with industrial dump cars, suction dredge equipment, drag-line scraper machine, conveying machinery and other equipment.

City Council, Dallas, Tex., has been authorized to arrange bond issue of $300,000 for extensions and improvements in municipal airport at Love Field. City engineering department will be in charge. M. R. Fewell, aviation secretary, Dallas Chamber of Commerce, will be active in project.

▲▲▲

Detroit

BIDS have been asked on general contract by United Steel & Wire Co., Battle Creek, Mich., for one-story addition, to cost over $35,000 with equipment. L. J. Sarvis, Battle Creek, is architect.

Board of Education, Redford, Mich., plans installation of manual training equipment in new two and three-story high school, to cost about $700,000 with equipment. Frank Eurich, Jr., Hofmann Building, Detroit, is architect.

A. H. Burkhardt, 731 Evelyn Street, Grand Rapids, Mich., and associates have organized Burkhardt Brothers Co., 316 Douglas Street, N. W., to operate local plant for production of sheet metal products, also iron specialties. O. J. and P. F. Burkhardt, Albion, Mich., will be officials of new company.

Board of Education, Grand Rapids, Mich., plans installation of manual training equipment in new junior high school, to cost over $200,000, for which general contract has been let to R. G. Phelps, Battle Creek. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Columbus Metal Tire Cover Co., 11111 French Road, Detroit, recently organized, plans operation of local works for production of metal automobile tire covers and kindred products. Carl C. Copeland, Jr., 165 Stanberry Avenue, Columbus, Ohio, and Carl C. Kreba, 706 Hazlewood Avenue, Detroit, head new organization.

National Stamping Co., 617 Glover Street, Detroit, manufacturer of metal stampings, has awarded general contract to W. J. C. Kaufmann, 10610 Shoemaker Street, for one-story addition to cost about $25,000 with equipment.

De Vaux-Hall Motors Corpn., Grand Rapids, Mich., now operating in portion of local plant of Hayes Body Corpn., for production of new six-cylinder automobile, has leased additional property near plant, totaling about 30,000 sq. ft. floor space, for extensions in production division.

Erich A. Jastrow, 2937 Pennsylvania Avenue, Detroit, and associates have organized International Conveyor & Washer Corpn., 1059 Beaufait Street, and plan operation of factory for manufacture of conveying and kindred equipment. Willard C. Wernet, Grosse Pointe Park, Detroit, is interested in new company.

Jackson Furnace & Foundry Co., Jackson, Mich., has changed its name to Jackson Foundry Co.

Davis Tool & Engineering Co., 6481 Epworth Boulevard, Detroit, has authorized increase in capital from nominal amount of $10,000 to $250,000 for general expansion.

▲▲▲

Indiana

PLANS are under way by Smith Steel Casting Corpn., Anderson, organized by R. E. Dudley, Anderson, and associates, for establishment of foundry at former local plant of Lavelle Co., for production of steel and iron castings, to cost over $10,000. Mr. Dudley will be in charge of project.

American Lead Co., 1600 East Twenty-first Street, Indianapolis, has arranged for consolidation with Indiana Smelting & Refining Corpn., 2302 Bloyd Avenue, and will operate in future under first-noted name. Expansion will be carried out with removal of Indiana Smelting plant to American Lead works, where production will be concentrated.

C. C. Shipp & Co., Inc., Indianapolis, has been organized with capital of $500,000 to take over and expand company of same name, with plant and offices at 212 Castle Hall Street, manufacturer of iron and steel products, copper, brass and other metal goods. N. M. Campbell is one of incorporators of new company.

National Equipment Co., 400 West First Street, Bloomington, has been inquiring for a steam locomotive crane, 50 to 60 tons capacity, self-propelling type.

Northern Indiana Public Service Co., Hammond, has arranged for purchase of municipal electric lighting plant at Goshen and will consolidate. Purchasing company contemplates expansion in Goshen district, including transmission lines.

General Glass Corpa., Winchester, has been organized with a capital of $500,000 by W. H. Mandeville, Elmira, N. Y., and associates, to operate local plant of Turner Glass Corpn., manufacturer of hollowware products, recently secured by Mr. Mandeville at a public sale. New company plans improvements. H. C. Mandeville will be an official of organization.

▲▲▲

Cleveland

PLANS are under way by United States Gypsum Co., 300 West Adams Street, Chicago, for extensions in building products manufacturing plant at Warren, Ohio, to cost close to $100,000 with equipment.

Irving Swedler, 14 Seventeenth Street, Toledo, Ohio, is at head of project to erect a one-story aircraft manufacturing plant, 50 x 150 ft., including parts and assembling departments, to cost close to $30,000 with equipment.

Following completion of new oil refinery about six miles from Toledo, Ohio, Pure Oil Co., Wabash Avenue and Wacker Drive, Chicago, has authorized construction of a pipe line to plant of Libbey-Owens-Ford Glass Co., at Rossford, Ohio, where refinery gas, a by-product of production of gasoline, will be used for plant service. New line will cost close to $1,000,000 with compressor stations and other equipment.

Goodrich Silvertown Tire Co., Akron, Ohio, an interest of B. F. Goodrich Co., Akron, has awarded general contract to J. H. Kerkebile & Sons Co., foot of Whittier Street, Toledo, Ohio, for new factory branch, service and sales building at Toledo, to cost about $100,000 with equipment.

Jordan Motors Corpn., Cleveland, recently organized to take over plant and business of Jordan Motor Car Co., 1070 East 152nd Street, is arranging for a stock issue to total $2,140,000, part of fund to be used for property acquisition and development. New company is planning production of automobiles in medium price range.

Waldock Packing Co., Sandusky, Ohio, has plans for two-story and basement addition to food products packing plant, to cost about $45,000 with equipment. Anders & Reimers, Columbia Building, Cleveland, are architects.

Stewart Bolling & Co., Inc., Cleveland, has moved from 1105 Chester Avenue to 5207 Lakeside Avenue.

▲▲▲

Pacific Coast

PLANS are being completed by California Lime & Products Co., Lincoln, Cal., for initial unit of new lime manufacturing plant at Antelope, Cal., where 60 acres was recently acquired. Project will include development of limestone quarry, with installation of conveying, loading and other equipment, also a dry ice-manufacturing unit. Project will cost over $150,000. Other units will be built later to make total investment of more than $500,000. Smith-Emery Co., 651 Howard Street, San Francisco, is engineer.

In connection with construction and improvement budget for 1931, San Diego Consolidated Gas & Electric Co., San Diego, Cal., is arranging fund of $1,325,000 for extensions and betterments in electric generating equipment and facilities, including transmission lines. A fund of $200,000 will be used for steam power plant extensions and equipment, while $750,000 will be expended for expansion and improvements in gas plants and distributing lines.

Terra Bella Refining Co., Terra Bella, Cal., has plans for a new oil refinery on Deer Creek, near Porterville, Cal., to cost about $100,000 with equipment.

Hollister School District, Hollister, Cal., has plans for a one-story addition to school on Monterey Street, for a manual training department. E. C. Griffin, Hollister, is architect.

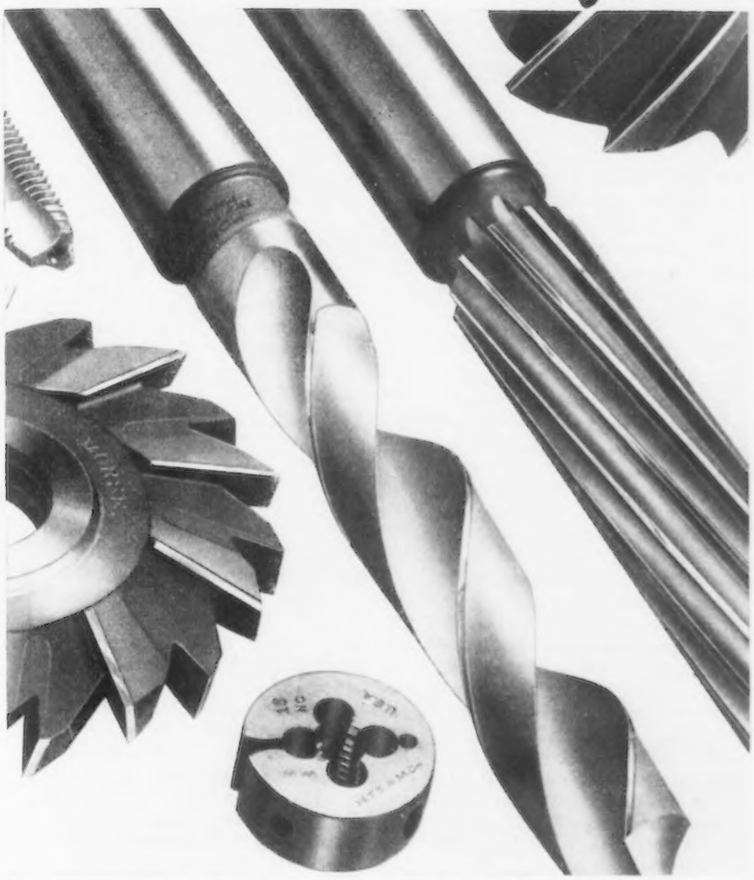
City Council, Sacramento, has plans for a hangar at municipal airport, with repair facilities, to cost about $65,000 with equipment. Starks & Flanders, Forum Building, are architects.

Vernon Oil Refining Co., 2500 East Twenty-sixth Street, Vernon, has plans for a new distilling and fractionating addition to local oil refinery, to cost over $75,000 with machinery. Neil F. Blaine is company engineer.

In connection with expansion and improvements at yards at Salt Lake City, Utah, Union Pacific Railroad Co., Omaha, Neb., is planning erection of new power plant to cost $238,000, with engine-generator unit and other machinery. Company also contemplates several smaller motor-generator stations in this district. Company engineering department, Omaha, will be in charge.

United States Metallic Magnesium Co., Knowles Building, Payson, Utah, is plan-

Production Figures Improve *when* MORSE Tools do the Cutting



The Morse Line includes High Speed and Carbon

- DRILLS
- REAMERS
- CUTTERS
- TAPS AND DIES
- SCREW PLATES
- ARBORS
- CHUCKS
- COUNTERBORES
- MANDRELS
- TAPER PINS
- SOCKETS
- SLEEVES

PRODUCTION figures cannot help showing a change for the better when the cutting tools last longer between sharpenings as MORSE tools do.

Careful accounting in thousands of plants has given MORSE Tools full credit for reduced production cost and increased production output.

MORSE

TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASS., U.S.A.

Business as Others See It

Digest of Current Financial and Economic Opinion

WAGE rate reductions are being reported with increasing frequency and, according to the varying viewpoints of observers, are regarded as a boon or a menace, or neither. William Green, in the April issue of the *American Federationist*, concedes that leading industrial executives have made an "unprecedented effort to maintain wage rates" and contrasts their "practical appreciation of the need to maintain consumer buying" with the "recurring suggestion of bankers for 'liquidation'—deflation."

Wage deflation, he asserts, is not a necessary concomitant of price deflation. "Price levels may well be falling as wages rise in an era of great technical progress or labor activity for a more equitable share. . . . Should wage rates vary with prices, wage earners would not have a chance to advance their standard of living or to increase their participation in the income from production. In other words, the door to progress would be closed."

Advocates Advance in Wages

The interdependence of high wages and prosperity is also stressed by Ethelbert Stewart, commissioner of the United States Bureau of Labor Statistics, who declares that the way to cure overproduction is not to decrease wage rates, but to increase them. The American people, he states, would gladly buy in sufficient quantities to eliminate overproduction if they had sufficient buying power.

But to the detached observer it seems futile to talk of a general rise in wage rates, no matter how desirable that might be, at a time when the wage structure shows cumulative weakness. Whatever may be the trend of *real* wages, it is becoming apparent that dollar wage rates, Mr. Green to the contrary notwithstanding, cannot remain entirely unaffected by major swings in commodity prices. The outstanding fact in business today is that unusually severe price liquidation has failed to stimulate consumption and that unrelieved price competition is reacting against wages.

Worker's Main Concern Is a Job

Current discussion of wage rates impresses many business executives as fully as academic, under present conditions, as the agitation for unemployment insurance. Neither maintenance of *rates* of pay nor insurance schemes will pull us out of the present depression. "A wage rate paid only for part-time work becomes by that fact essentially a fiction," declares Benjamin Baker in the *Annalist*. "The practical point for the workman is not primarily the rate of wages per hour, but whether he earns enough in a week to give him a decent living."

In other words, the prime consideration of the employee is a job. Similarly, the principal concern of industry as a whole has been to provide a maximum of employment. Where wage rates have been maintained, it has been with due recognition of the fact that individual earnings on a part-time basis have already been sharply reduced. Moreover, as Stephen Bell points out in *Commerce and Finance*, the commodity prices that have been reduced do not include some of the main items in living costs. "Rents are two to three times the pre-war level, and a goodly number of articles unknown before the war have come to be real necessities today."

Price Deflation Weakens Wage Structure

Undoubtedly employers, with some exceptions, are doing all they can to tide their working forces over a difficult period. But they cannot indefinitely ignore persistent recessions in the prices of the products that they sell. "A long list of commodities," according to Brookmire, "has fallen to levels not before seen in the present century, levels far below the cost of production."

When will bottom be reached? The *Annalist* believes that there may be still further price deflation. Brookmire feels that a turn for the better is at hand. "Liquidation has proceeded to a point where the constructive forces of deferred demand, declining inventories, and stronger financial situation outweigh the deterring factors, such as overbuilding in the cities, depression in farm income, large bank loans to individual customers and weak position of automobile dealers."

ning erection of new plant at magnesium properties in Picayune Canyon, initial works to cost close to $50,000 with equipment.

San Joaquin Light & Power Co., Fresno, Cal., has secured permission to take over plants and property of Midland Counties Public Service Corpn., and to issue stock in amount of $729,000. Purchasing company will consolidate with system and plans expansion and improvements, including immediate construction of transmission lines.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has awarded general contract to Clinton-Stephenson Construction Co., Monadnock Building, for one-story equipment storage and distributing plant at Redwood City, Cal., with service and repair department, to cost close to $50,000.

Liquid Sugar Corpn., 637 Battery Street, San Francisco, will soon call for bids on general contract for new three-story refinery at San Jose, Cal., to cost about $100,000 with machinery.

Cragar Corpn. has started operations in a new plant in Hollywood industrial area of Los Angeles for manufacture of automobile accessories and specialties. Plant also uses a large experimental and production engineering laboratory. Cragar Corpn. was formed through purchase of Gillette-Severy-Clark Co., Miller Production Co. and Schofield, Inc., of America. Miller and Schofield companies, which were large producers of automobile specialties, have been operated under a receivership for some time. Harlan Fengler is vice-president and general manager and Walter Hogarth is superintendent of production.

Foreign

PLANS are being considered by Rio Tinto Co., Ltd., England, for a new electrolytic refinery to handle output from copper mines of Rhokana Corpn., Ltd., an affiliated organization, in South Africa. Last-noted company, formerly known as Rhodesian Congo Border Concessions, Ltd., is planning expansion at its N'Kana mine, including installation of machinery, to cost over £2,000,000 (about $9,720,000). Sir Auckland Geddes is chairman of board of Rio Tinto company.

A company at Buenos Aires, Argentina, has secured a concession to erect an oil refinery to have initial capacity of 10,000 bbl. a day. A division will be established for production of gasoline. Charles H. Ducote, Buenos Aires, Assistant United States Trade Commissioner in that city, has information regarding project.

Merger has been arranged between Gramophone Co., Ltd., and Columbia Graphophone Co., Ltd., both of London, England, manufacturers of talking machines and parts, radio equipment, etc. New company will be organized to combine interests and carry out expansion. Radio Corpn. of America, Inc., Woolworth Building, New York, is interested in first-noted organization; Columbia Phonograph Co., 1819 Broadway, New York, is a subsidiary of Columbia Graphophone Co., Ltd.